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ABSTRACT

The first volume of the study contains a 25-page overview of the complete feasibility study (Phase II), including sections on pedagogical feasibility, management feasibility, economic feasibility, simulation modeling, client acceptability, inservice design, evaluation and research, and maintaining relevance of the model for teacher education in the 1970's. The remainder of the document is devoted to a detailed description of the pedagogical feasibility study, which tested through actual use the proficiency modules and instructional alternatives in five curriculum areas: social studies, language arts, scuence, mathematics, and human relations. For each of these areas there is a description of the evaluation procedure used, a listing of performance criteria and instructional alternatives, and a list of equipment required and costs. Questionnaires and other instruments used in the evaluation are included. Central findings of the pedagogical feasibility study are 1) a large number of students are able to pass performance criteria without taking any instructional alternatives; 2) students enjoyed having a variety of instructional alternatives open to them, but often preferred regular classroom work; 3) no differences in achievement appeared between students who took different instructional alternatives. (Volume II of the study is SP 004 260, and a separate summary of Phase II is SP 004 261. Phase I final report is ED 025 490.) (RT)

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Final Report

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A FEASIBILITY STUDY ON THE MODEL ELEMENTARY TEACHER EDUCATION PROGRAM

(PHASE II)

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Amherst, Massachusetts

January 1, 1970

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CONTENTS

Section

I. OVERVIEW. 1

II. PEDAGOGICAL FEASIBILITY . . . .

SOCIAL STUDIES. 24
BIBLIOGRAPHY 68
APPENDIX A 71
APPENDIX B 89

LANGUAGE ARTS 99
BIBLIOGRAPHY 193
APPENDIX A 197

SCIENCE 157
BIBLIOGRAPHY 193
APPENDIX A 197
APPENDIX B 201

MATHEMATICS 212
BIBLIOGRAPHY 246
APPENDIX A 253
APPENDIX B 260
APPENDIX C 264
APPENDIX D 268
APPENDIX E 272
APPENDIX F 275

HUMAN RELATIONS 278
BIBLIOGRAPHY 323

III. PART I. MANAGEMENT FEASIBILITY 326
BIBLIOGRAPHY 380
APPENDIX A 381

III. PART II. MANAGEMENT INFORMATION SYSTEM 385
BIBLIOGRAPHY 432
APPENDIX A 434

III. PART III. TESTING AND GUIDANCE OPERATIONS. 438

IV. ECONOMIC FEASIBILITY 450
BIBLIOGRAPHY 498
APPENDIX A 500
APPENDIX B 505

V. SIMULATION MODELING 526

VI. CLIENT ACCEPTABILITY 534
APPENDIX A 547
APPENDIX B 551

VII. INSERVICE DESIGN 553
BIBLIOGRAPHY 560
APPENDIX A 562
APPENDIX B 580

VIII. EVALUATION AND RESEARCH 587
BIBLIOGRAPHY 604

XI. MAINTAINING RELEVANCE OF THE MODEL FOR TEACHER EDUCATION IN THE 1970's 609

LIST OF ILLUSTRATIONS

OVERVIEW

Figure Page

1. METEP Phase II Squared PERT Diagram 3

PEDAGOGICAL - Mathematics

Figure Page

1. Plots of the Regression Lines Indicated in Table 15 230

2. Plots of the Regression Lines 231

3. Plots of the Regression Lines Indicated in Table 17 233

4. Plots of the Regression Lines Indicated in Table 18 234

5. Plots of the Regression Lines Indicated in Table 19 235

6. Plots of the Regression Lines Indicated in Table 20 238

MANAGEMENT SYSTEM

Figure Page

1. Organizing Structure Present State of the Art 328

2. Organizing Program Process Present State of the Art 330

3. METEP Organization Programming Sequence 335

4. METEP Organization Structure 338

LIST OF ILLUSTRATIONS (Cont'd)

Figure Page

5. Management System in Relation to Other Systems METEP 344

6. METEP Management System - Example 346

7. Redesign of the Management System 349

8. Master Control Board 355

9. Problem Progress Report 358

10. Generalizing the METEP Model (Two Organizations). . . 367

11. Present Management Chart 372

12. Interim Organization 373

13. Management Chart Second Year -- Final Organizational Form 374

14. Implementation Activities: Management Subsystem 375

15. Implementation Activities: Pedagogical Programs 379

MANAGEMENT INFORMATION SYSTEM

Figure Page

1. File Processing Sequence for Management Information System 409

2. Information System 431

LIST OF ILLUSTRATIONS (Cont'd)

TESTING AND GUIDANCE

Figure Page

1. Testing and Guidance Subsystem 449

ECONOMIC FEASIBILITY

Figure

1. METEP Internal Budget Cycle 460
2. METEP 18 Month Budget Cycle 461
3. Budget Subsystem 470
4. Fiscal Accounting Model 473
5. Accounting Subsystem 476
6. Procurement Procedure 478
7. Cost-Effectiveness Data 481
8. METEP Financial Time Schedule 483
9. METEP Five-Year Financial Support Schedule 490

SIMULATION MODELING IN METEP

Figure Page

1. METEP Simulation 533

LIST OF TABLES

PEDAGOGICAL - Social Studies

Table Page

1. Kluckholn's Model. 29

2. Schedule, Topics, and Instructors. 38

3. Performance Criteria: Raw Score Passes at the Various Time Sequences. 45

4. Performance Criteria: Student Ratings and Time to Complete 51

5. Frequency of Instructional Alternative Choices. 54

6. Instructional Alternatives: Student Ratings and Time to Complete 61

PEDAGOGICAL - Language Arts

Table Page

1. Hierarchical Distribution of the Performance Criteria 102

PEDAGOGICAL - Science

Table Page

1. Groups and Number of People in Them. 187

PEDAGOGICAL - Mathematics

Page

Table

1. Feasibility Study Design, With Cell Frequencies Indicated, For the Independent Variables of Treatment and Selection and the Dependent Variable of Content Achievement. 219

LIST OF TABLES (Cont'd)

Table Page

2. Feasibility Study Design, with Cell Frequencies Indicated, for the Independent Variable of Selection and the Dependent Variable of Content Achievement. 219

3. Feasibility Design, With Cell Frequencies Indicated, for the Independent Variable of Treatment and the Dependent Variable of Content Achievement. 220

4. Data for the Feasibility Study Design Indicated in Table 2 220

5. Analysis of Covariance for the Data in Table 4 . . . 221

6. Data for the Feasibility Design Indicated in Table 3. 221

7. Analysis of Covariance for the Data of Table 6 . . . 222

8. Feasibility Study Design, With Cell Frequencies Indicated, for the Independent Variables of Treatment and Selection and the Dependent Variables of Attitude. 223

9. Data for the Feasibility Study Destgn Indicated in Table 8 for the Dependent Variable of Attitude Toward the Text Mode of Instruction. 224

10. Analysis of Covariance for the Data of Table 9 . . . 224

11. Data for the Feasibility Study Design as Indicated In Tables for the Dependent Variable of Attitude Toward the A-V Mode of Instruction 225

12. Analysis of Covariance for the Data of Table 11. . . 225

13. Means on Each of the Attitude Pre-Tests for Each of the Free-Choice Groups. 226

14. Feasibility Study Design, with Cell Frequencies Indicated, for Each Regression Analysis of Aptitude by Content Post-Test Achievement. 228

LIST OF TABLES (Cont'd)

Table Page

15. Regression Analysis of the Aptitude of Abstract Thinking (x) By Content Post-Test Achievement (y) for the Design Indicated in Table 14. 229

16. Regression Analysis of the Aptitude of Space Relations (x) By Content Post-Test Achievement (y) For the Design Indicated in Table 14. 229

17. Regression Analysis of the Aptitude of Verbal Reasoning (x) By Content Post=Test Achievement (y) For the Design Indicated in Table 14 232

18. Regression Analysis of the Aptitude of Numerical Reasoning (x) By Content Post-Test Achievement (y) For the Design Indicated In Table 14 236

19. Regression Analysis of the Number of Years of College Preparatory Courses in Mathematics Taken in High School (x) By Content Post-Test Achievement (y) For The Design Indicated In Table 14 237

20. Regression Analysis of the Number of Three Semester-Hour Courses in Mathematics Taken in College (x) By Content Post-Test Achievement (y) For Each Treatment Level in the Design Indicated in Table 14 239

21. Mean Estimates of Time, In Hours, Spent In The Text Mode and The Other Available Mode of Instructional Alternatives, and the Mean Estimate of Work Load, By Each of Selected Groupings of Students 240

22. Percentage of Correct Responses to Total Responses For Each Item on the Content Pre-Test and Post-Test for Selected Groupings of Students. 242

LIST OF TABLES (Cont'd)

MANAGEMENT INFORMATION SUBSYSTEM

Table Page

1. Initial Specifications For PC and IA Variety For A Feasible Bench Mark Design. 400

2. File Types and Structures 404

3. Estimated Cost/Student Per Academic Year Versus PC Count and Size of Student Population 421

ECONOMIC FEASIBILITY

Table Page

1. Year-5 Staffing Requirements. 487

2. Faculty Ratios Year 1 - 5 488

3. Compilation of Total Costs. 491

4. Comparative Costs 493

SECTION I OVERVIEW

OVERVIEW

Introduction

The central purpose of the feasibility testing was to determine whether or not a performance based curriculum model, utilizing performance criteria and instructional alternatives as organizing elements, could successfully be adopted as a planning principle in designing and developing a new model of teacher education.

The study was concerned with answering six questions regarding feasibility:

1. Is the model pedagogically feasibile?
2. Is the model economically feasible?
3. Is the model administratively feasible?
4. Is the model technically feasible?
5. Are the clients, whom the program is designed to serve, satisfied with the model?
6. How will the model itself insure updating and maintain its relevance for teacher education in the 1970's.

Rationale. The rationale for the METEP program can be summarized as follows:

1. For education to be truly responsive to the changing needs of both society and individuals, educational goals are an integral part in the initial planning and programming process.
2. The process of change must be institutionalized so that it becomes an integral part of the educational structure.
3. The criterion of time currently used to measure the educational progress of a student is at best only incidently relevant to the student's ability to perform intellectually.
4. Optimal individual learning conditions may be created if educators learn to correctly match teachers, materials, structures, and students.

5. A flexible teacher education structure is required if new alternatives for learning opportunities and experiences are to be conceived, implemented, and evaluated. Variable entry and exit points, performance criteria, multiple instructional routes for individualized instruction, differentiated staffing patterns, formative and summative evaluation, micro teaching, and continual inservice training programs become the unifying elements of the program.

Phase II Project Management. The tasks of the pedagogical and administrative teams were coordinated by means of a squared PERT diagram. See Figure 1 . The diagram shows a timetable for each of the activities performed as part of the feasibility study. The diagram also shows the interrelation of the various project activities. The PERT diagram helped to determine what had to be done, when, by whom, and in what time. Communications were maintained between these teams through a series of weekly meetings of the team coordinators. The team coordinators, along with the project management, served as the control unit for the project. This unit coordinated all of the decision making activities. Following the development phase of the project, each of the units prepared an interim progress report. As another means of interrelating project activities, copies of the progress reports were distributed among the members of each unit of the project. As a final activity, each of the teams was asked to draft and prepare final reports; a summary of each follows. The reports in their entirety, are contained in other sections of this document.

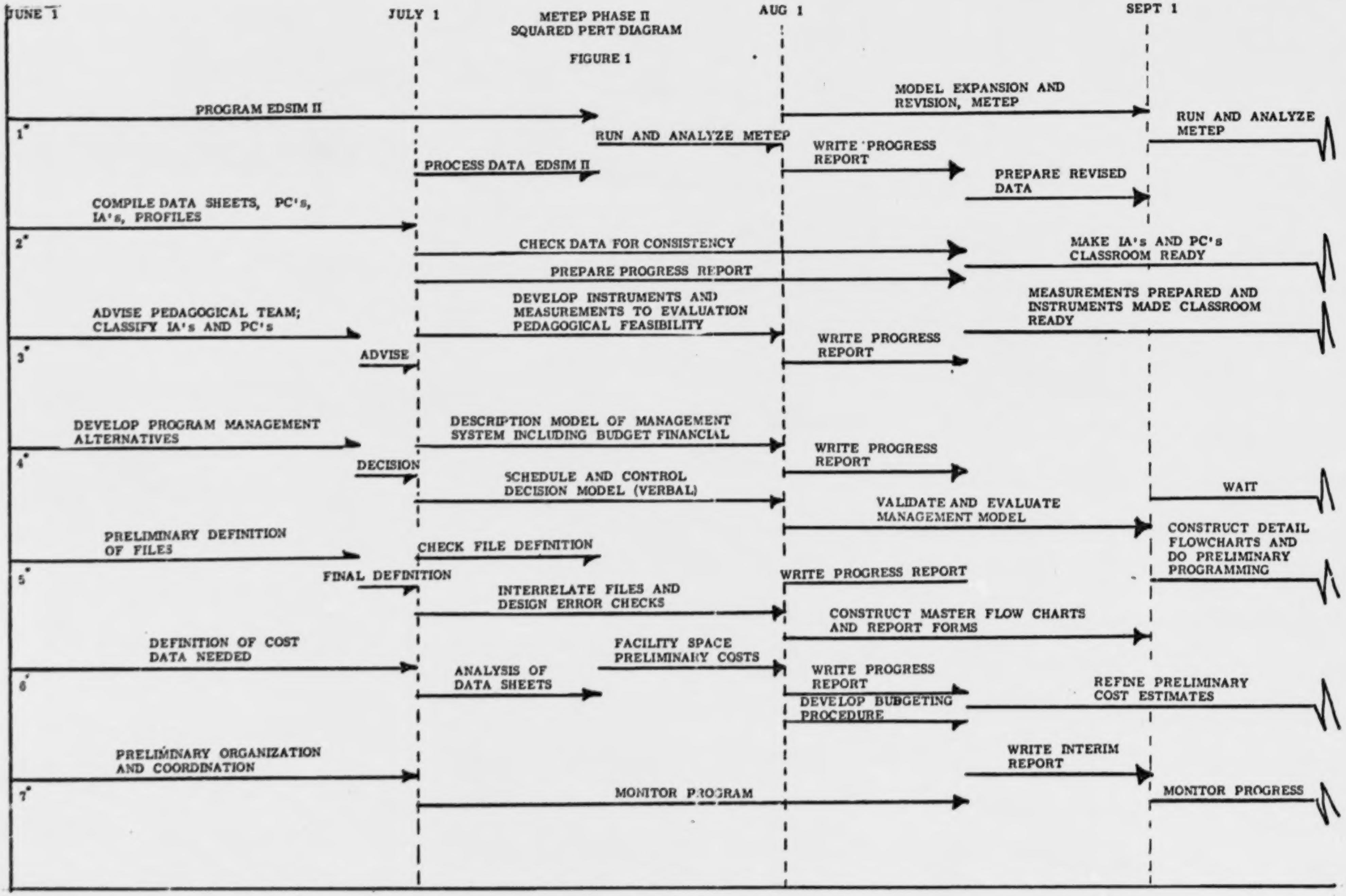
Pedagogical Feasibility

The central question asked by the several educational teams examining the validity and feasibility of the performance curriculum approach was the rather prosaic, "Does it work?" In addition, most team members are planning extensions and amplification of their work They see themselves entering into a new career area, that of defining more precisely educational objectives and using this procedure to free students to develop into more fully mature professional educators.

The five teams exploring pedagogical feasibility were divided into social studies, language arts, science, mathematics and human relations. Each approached the problem of feasibility from a different perspective. The Language Arts team, for example, tested all performance criteria with all elementary students involved in the teacher training program. Mathematics, on the other hand, completed a detailed evaluation of only one week's study material; in this way,

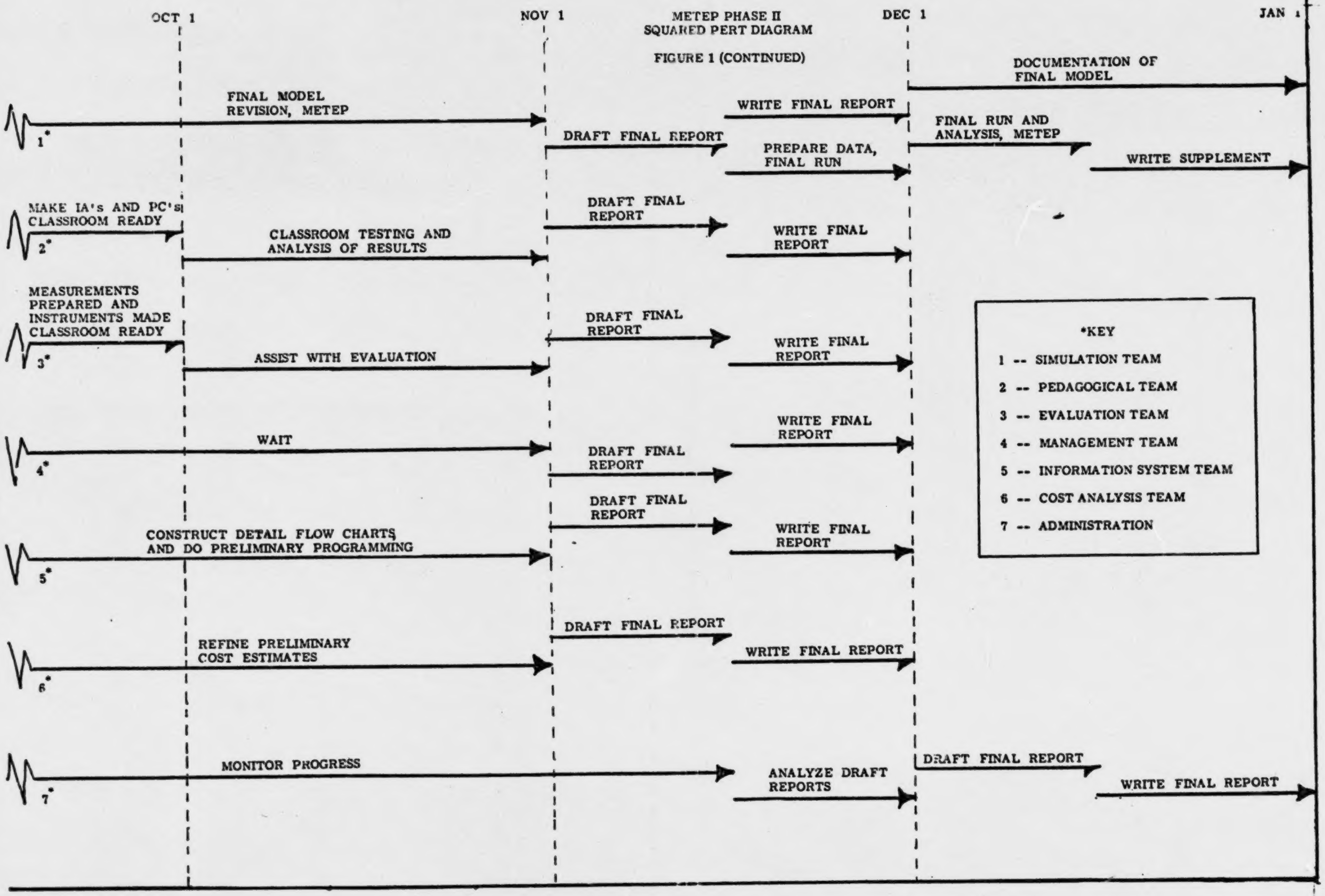
METEP PHASE II
SQUARED PERT DIAGRAM

FIGURE 1


JUNE 1
JULY 1
AUG 1
SEPT 1
1*
PROGRAM EDSIM II
MODEL EXPANSION AND REVISION, METEP
RUN AND ANALYZE METEP
RUN AND ANALYZE METEP
WRITE PROGRESS REPORT
PROCESS DATA EDSIM II
PREPARE REVISED DATA
2*
COMPILE DATA SHEETS, PC's, IA's, PROFILES
CHECK DATA FOR CONSISTENCY
MAKE IA's AND PC's CLASSROOM READY
PREPARE PROGRESS REPORT
3*
ADVISE PEDAGOGICAL TEAM; CLASSIFY IA's AND PC's
DEVELOP INSTRUMENTS AND MEASUREMENTS TO EVALUATION PEDAGOGICAL FEASIBILITY
MEASUREMENTS PREPARED AND INSTRUMENTS MADE CLASSROOM READY
ADVISE
WRITE PROGRESS REPORT
4*
DEVELOP PROGRAM MANAGEMENT ALTERNATIVES
DESCRIPTION MODEL OF MANAGEMENT SYSTEM INCLUDING BUDGET FINANCIAL
WRITE PROGRESS REPORT
DECISION
SCHEDULE AND CONTROL DECISION MODEL (VERBAL)
WAIT
VALIDATE AND EVALUATE MANAGEMENT MODEL
5*
PRELIMINARY DEFINITION OF FILES
CHECK FILE DEFINITION
CONSTRUCT DETAIL FLOWCHARTS AND DO PRELIMINARY PROGRAMMING
FINAL DEFINITION
WRITE PROGRESS REPORT
INTERRELATE FILES AND DESIGN ERROR CHECKS
CONSTRUCT MASTER FLOW CHARTS AND REPORT FORMS
6*
DEFINITION OF COST DATA NEEDED
FACILITY SPACE PRELIMINARY COSTS
ANALYSIS OF DATA SHEETS
WRITE PROGRESS REPORT
REFINE PRELIMINARY COST ESTIMATES
DEVELOP BUDGETING PROCEDURE
7*
PRELIMINARY ORGANIZATION AND COORDINATION
WRITE INTERIM REPORT
MONITOR PROGRAM
MONITOR PROGRESS

METEP PHASE II
SQUARED PERT DIAGRAM

FIGURE 1 (CONTINUED)


OCT 1
NOV 1
DEC 1
JAN 1
FINAL MODEL REVISION, METEP
DRAFT FINAL REPORT
WRITE FINAL REPORT
DOCUMENTATION OF FINAL MODEL
PREPARE DATA, FINAL RUN
FINAL RUN AND ANALYSIS, METEP
WRITE SUPPLEMENT
1*
MAKE IA's AND PC's CLASSROOM READY
CLASSROOM TESTING AND ANALYSIS OF RESULTS
DRAFT FINAL REPORT
WRITE FINAL REPORT
2*
MEASUREMENTS PREPARED AND INSTRUMENTS MADE CLASSROOM READY
ASSIST WITH EVALUATION
DRAFT FINAL REPORT
WRITE FINAL REPORT
3*
WAIT
DRAFT FINAL REPORT
WRITE FINAL REPORT
4*
CONSTRUCT DETAIL FLOW CHARTS AND DO PRELIMINARY PROGRAMMING
DRAFT FINAL REPORT
WRITE FINAL REPORT
5*
REFINE PRELIMINARY COST ESTIMATES
DRAFT FINAL REPORT
WRITE FINAL REPORT
6*
MONITOR PROGRESS
ANALYZE DRAFT REPORTS
DRAFT FINAL REPORT
WRITE FINAL REPORT
7*
*KEY
1 -- SIMULATION TEAM
2 -- PEDAGOGICAL TEAM
3 -- EVALUATION TEAM
4 -- MANAGEMENT TEAM
5 -- INFORMATION SYSTEM TEAM
6 -- COST ANALYSIS TEAM
7 -- ADMINISTRATION

useful information on the aptitude-treatment interactions was gained. Human Relations was testing totally new constructs and needed to determine if the constructs did indeed exist and were measurable.

As such, the five reports summarized here are very different in their nature. Purposely, they answer different aspects of the performance curriculum's workability. The question is whether or not the individual investigators believe that student interest, accomplishment, and achievement merit further effort on their part. The answer to this question appears to be a resounding, "yes".

The University of Massachusetts School of Education maintains a five week education "block." During the first three weeks of the semester, elementary trainees observed their future cooperating teachers in classroom situations. This was followed by a five week period in which students were instructed in educational methods and then by eight weeks of practice teaching. This report distills the activities and findings of the five pedagogical teams during the five week block period.

A concise listing of the central pedagogical findings with potential future directions follows the short summaries.

Social Studies. The Social Studies team sought to acquaint the teacher trainees with four key aspects of social studies education: 1) Model building. Students were introduced to several basic social science models (e.g. Leonard, Kluckhohn) and shown how the models can be used to provide pupils with an overall conceptual scheme of social sciences for interpreting and categorizing facts and data; 2) Skills. Students were introduced to the skills of social studies (maps, references, written data, analysis); 3) Values. Teacher trainees were introduced to the problem of how to help elementary pupils become aware of issues and decisions and the values which underlie them; 4) Practical training. Trainees were encouraged and supported in efforts to develop lesson plans, coordination with other subject matter fields, and general planning efforts useful in the classroom.

Performance criteria were selected which are representative of the specific aspects of social studies discussed above. A representative sampling of the entire program was selected so that an overall picture of this method of instruction's effectiveness might be possible. The program which developed placed heavy emphasis on permitting students to chose between individual work or classroom interaction. However, additional instructional alternatives such as visual material, videotape, and programmed instructional materials were made available.

The major findings of the study were as follows:

1. Approximately 80% of the students mastered the performance criteria after taking one instructional alternative (IA) 95% after 2 IAs. Three performance criteria were completed by 80% of the students without any instructional alternatives.

2. All but one of the performance criteria in the program were rated positively by the students. Generally, knowledge and values PCs were rated lower than practical training and skills.

3. There was a wide range of time required to complete the performance criteria. In one case, the range varied from 15 minutes to 5 hours.

4. A sample of more demanding, specialist level PCs were administered. It was found that most students, with effort, could complete specialist level material in the social studies.

5. Classroom instruction was the most often chosen instructional alternative by a wide margin.

6. Students appeared to respond positively to the program and rated the various performance criteria predominantly in the "very good" or "good" range.

The Social Studies team found the concepts of the performance curriculum workable. They are interested in updating and making the knowledge and values sections more "relevant" to the students, as it is believed that these two areas are potentially most important to every teacher trainee.

Language Arts. Communication is the prime focus of the Reading and Language Arts team. Language arts include listening speaking, reading, and writing. Newly considered techniques such as non-verbal communication, technological developments, and multiple media methods were incorporated into the program. Traditional successful media was not ignored or discarded, but their use was retained only when they were the most relevant and applicable materials.

With this philosophy in mind, the Language Arts team selected performance criteria which would enable the teacher trainee to: 1) communicate effectively both verbally and non-verbally; 2) have knowledge of the processes of communication; 3) ability to diagnose skills necessary for communication; 4) have knowledge of a variety of approaches and material for teaching language arts, and be able to select these materials appropriately. Twenty eight specific performance criteria were selected which touch on all four aspects of language arts learning.

Language arts included all 120 students in the elementary education "block" and was the only group which was able to test their program in a "full reality setting." As such, data analyses were greatly complicated and it was not possible to provide substantive statistical findings as of the time this report was written. A comprehensive set of measurements has been taken and will be reported later.

Important subjective findings at this point include:

1. Generally, most of the students were very enthusiastic about the program. They commented that they felt better prepared to teach reading and language arts than many of their predecessors had communicated to them.

2. Students were especially pleased with the variety of approaches and materials presented. For example, the use of such approaches as basal, eclectic, linguistic, phonic, i/t/a, programmed, individualized and experience approaches to teaching reading was proved valuable in the field.

3. Although most of the students selected the lecture as their primary instructional alternative, the fact that the choice was legitimately theirs greatly affected their attitude toward the instructional alternative. Students admitted that if it had been easier to gain access to the audio-visual equipment they might have used these instructional alternatives to a greater extent. This will be investigated further during the coming term.

4. Many of the students were pressed for time. It is suggested that a longer time be made available to complete the performance curriculum in this area.

The prime evaluation of this program might be found in the model student response that they were now aware of many alternative approaches to teaching language arts skills and had internalized the concept that no one approach was the exclusively correct one. As such, the Language Arts team feels strongly that the performance approach was successful and looks forward to finding more means of relating it directly and immediately to the student's practical needs.

Science. The Science team examined a broad range of performance criteria selected as representative of many important constructs and methods in science. These criteria were selected from an examination of science and science teaching with a special effort to select broad skills which might be useful in more than one scientific area.

Five goals for the Science team were identified: 1) to discover the present ability of prospective elementary teachers in scientific areas. This was examined through each student's ability to pass the performance criteria without further instruction; 2) to develop alternative routes of instruction for the trainee who did not pass the performance criteria. Special emphasis was given to the fact that different instructional routes are more favorable for some students than others; 3) to allow students to move through the performance curriculum at their own rate emphasizing with them the importance of individual differences; 4) to test the value of instructional alternatives by measuring failure versus success rates; 5) to consider the long-term benefits of this type of instruction. In effect, do students carry-over their learning of this type of instruction to the classroom? This last objective will be examined at a later date.

Some of the key findings follow:

1. 58% of the performance criteria were passed without the student having to take an instructional alternative. Only 3% who thought they could complete a PC without taking an instructional alternative were unable to pass the test. This would seem to indicate the validity of utilizing the performance criterion (PC) approach as a method to save student and professor time, since the students are obviously acquiring many of the necessary skills and knowledges in their science courses in the College of Arts and Sciences.

2. Most students chose class instruction as their first instructional alternative. Second choice was videotape when available. Next came talking to friends, and least popular were the selected readings. Students who attended class tended to take a longer time to pass the PC than those who selected other routes.

3. After taking an instructional alternative, approximately 5% of the students failed and had to receive further instruction. Many students seemed afraid to deviate from the traditional pattern of attending classes. Due to the low failure rate, it was not possible to compare adequately the quality of the instructional routes.

4. Student evaluation forms indicate general satisfaction with the program.

On a more subjective basis, the instructors in the program felt that the students were overly concerned about passing PCs and may not have given sufficient attention to understanding on a broader basis. This might be termed a "please the teacher" syndrome. Caution is recommended in utilizing this approach on a four year basis. Special attention in the future should be given to developing performance criteria which emphasize divergent thinking and creativity rather than being exclusively concerned with convergent behavioral outcomes.

Mathematics. The Mathematics team has developed a comprehensive approach to the teaching of this subject within a performance curriculum which involves mathematical content, pedagogical method, and expressive experience. Within the limited time of the feasibility study, the Mathematics team elected to consider one component of the program so as to examine one area in detail. The module selected was numeration systems for the system of whole numbers, roughly equivalent to a typical week's work in a regular course.

The feasibility study examined the performance criteria of that module through comparison of the effectiveness of four instructional alternatives; 1) classroom instruction; 2) semi-automatic audiovisual; 3) written programmed instruction; and 4) standard textbook. All of these instructional alternatives should be clear except possibly #2, in which students worked independently in a study carrel equipped with a semi-automatic audiovisual instructional system. Visual and oral illustrations and examples were presented to students.

Twelve students were assigned to each of the four instructional modes while an additional 48 students were given free choice to select which instructional mode they themselves felt was most appropriate.

The following were the key findings of this study:

1. The 96 students had a mean pre-test score of 2.4 and a mean post-test score of 11.1 out of a possible total of 15. This would seem to indicate that the students learned the specific content of the section.

2. No significant differences were found between any of the instructional methods as outlined above. It would seem that students can learn material via a variety of instructional routes.

3. The 48 students with free choice divided in their

choice of instructional alternatives as follows: class, 7: audio-visual 7, written, 4; and text, 30. No differences in achievement were found between free and directed choice of instructional modes.

4. Similar findings were found on attitudinal measures toward the instructional experiences on a semantic differential test for all but the audio-visual mode. Significant attitude improvement was shown on the AV mode.

5. Examination of student aptitude failed to reveal any consistent findings related to instructional alternatives.

However, this study raised more questions than it answered. While no statistically definable statement can made with regard to recommending one mode of instruction over another, or with regard to guiding students into any given mode on the basis of aptitude, replication with a greater number of students might more clearly define this issue.

It is believed that the mathematical program is well suited to a performance approach. Students appears to enjoy and appreciate the alternative methods for learning the material and the attention paid to individual differences (which alone might account for the lack of differences in demonstrated achievement). Future plans call for more extensive testing of other curricular areas of the mathematics program.

Human Relations. The central objective of the Human Relations team centered around their general performance criterion aimed toward developing the "intentional teacher." For practical purposes, the intentional teacher was defined as a teacher who was able to demonstrate a wide variety of specific human relations behaviors, teach them to others, and develop a variety of classroom procedures through which these skills could be taught to children. A special emphasis within this concept is that the intentional teacher must develop his own conception of human relations and his own way to teach human relations skills. Thus training in human relations was designed to facilitate each individual's own definition and development of human relations skills.

This broad and ambitious objective was made more operational by the testing of four specific performance hierarchies organized in an "each one-teach one" framework. Once a specific human relations skill was defined (e.g. relaxation, decision making, etc.), the skills were taught to the teacher trainees via a variety of instructional alternatives (individual or small group instruction, reading material, programmed text, videotape, or audiotape programs). The trainees then taught the skill they had just learned to a friend. After being "checked out" on their ability to perform and teach the specific skill in question, the trainees then taught a microteaching lesson to a small group of students in the laboratory school. This particular model requires that the student first learn the skill, then teach it to someone else, and finally, develop and adapt the skill so that it can be taught to elementary children.

Four areas were selected for hierarchy development: relaxation training (special emphasis on the importance of a relaxed person for the teaching and learning process), non-verbal skills (importance of communication other than through words), attending behavior (how listening skills can be taught and used for better interpersonal interaction and increased classroom communication), and decision making (development and selection of alternative possibilities for behaving in a variety of situations). Each specific hierarchy had a set of specific performance criteria attached to it. Students were not allowed to proceed to the next level until they had satisfactorily completed each step.

Evaluation of the program utilized a multi-measure procedure in which 22 experimental and non-experimental subjects were compared. The following were the major findings:

1. Experimental trainees developed more positive self-concepts as measured on a standardized self-concept instrument.

2. Experimental trainees rated themselves as more skilled on all four behavioral hierarchies on a semantic differential scale.

3. Behavioral measures of relaxation ability using delayed auditory feedback failed to reveal any differences between the two groups.

4. On a test of decision making, the experimental group identified significantly more alternatives of a higher quality.

5. Data on behavioral indices of attention and non-verbal skills have been stored on videotape and will be reported in detail later.

6. The experimental group developed a more extensive and higher quality program for teaching a human relations training program in racial relations when both groups were asked to generate a classroom unit in this area.

7. Course evaluation forms revealed an extremely positive student response to the entire program. All instructional alternatives were enjoyed, with microteaching the small elementary student groups probably the favorite activity.

In short, the program did seem to teach the specific behaviors which had been identified; the students enjoyed the program (8 out of 11 plan to continue advanced work this coming term), and, on a more subjective basis, students did seem to become more creative and intentional in their view toward themselves and others. The human relations team found the performance curriculum constructs workable and enjoyable and look forward to refinement and further development of more complete curricula in human relations.

Summary of Findings and Recommendations for Future Directions. Abstracting the findings from each area, the following conclusions seem central:

1. A large number of students are able to pass performance criteria without taking any instructional alternatives. This would suggest that much of the work in regular classrooms in educational methodology is not a useful exercise for many students and professors. The pre-test system permits students to avoid needless repetition of material they already know and frees them to move to more advanced concepts.

2. Students enjoyed having a variety of instructional alternatives open to them, but surprisingly often chose regular classroom work rather than other, more innovative approaches. It may be that students and professors both need more experience with less common instructional alternatives such as videotape and other multi-media approaches. Students clearly seemed to like the idea of choosing their own approach to learning and this seemed to motivate them better in the regular classroom.

3. No differences in achievement appeared between students who took different instructional alternatives. One explanation for this may be that the individualized approach emphasizing pass-fail criteria resulted in each student achieving the objectives. Further, each student may have

tended to select the instructional alternative most suitable for him as a way to achieve the common goal of passing the performance criterion. Aptitude-treatment interactions did not appear, perhaps for the reasons cited above.

4. Students and professors seemed to enjoy the performance curriculum approach. The one exception to this was the science staff who felt that the PCs selected did not allow for sufficient creativity on the part of the student. They expressed concern over some students who seemed more concerned with passing the criterion than learning the material. Seemingly, a performance curriculum approach does not always end this old problem.

5. The specific behaviors identified by the Human Relations team, such as relaxation, non-verbal skills, etc. seem measurable and definable for purpose of instruction. Students appear to be interested in this new area as a major area of interest within elementary education. In addition, specifying the precise expectations within a performance curriculum seemed to lead to more creativity and individuality.

Some future directions for the performance curriculum in elementary education seem apparent:

1. An entire elementary education program centered around the concepts of performance curricula seems feasible. As such, efforts in the future should center on improving specific curriculum areas, defining performance criteria more precisely, and conducting further research into the area.

2. Articulation between the curriculum areas is necessary as there are important relationships between them. As the several teams have developed specific performance criteria, it is increasingly apparent that some overlap exists. More important, however, is the discovery of structural similarities between fields. For example, the human relations construct of decision making is closely allied to creativity within science and language arts or to model building in social studies. It may eventually be possible to restructure the elementary curriculum around new skill constructs.

3. Important research areas have been opened. The present study has raised more questions than it has answered. We are interested in further studies of aptitude treatment interaction, the effectiveness of varying instructional alternatives, the "carry-over" of performance based

learning to the classroom, and other questions. After completion of this pilot phase, all participant investigators felt they were now ready to ask and seek answers to important questions. A knowledge and experience base for further investigation has been built by the several teams.

4. The METEP program seems applicable not only at the University of Massachusetts, but in other teacher education programs as well. Important in this conclusion is the fact that relatively precisely defined curricula and associated materials are easily transferred to a wide variety of settings. Once a performance curriculum is established, it is our subjective belief that paraprofessionals and aides can handle much of the specific supervision of daily management of the program. Evidence in several areas indicates that the performance curriculum can be arranged to foster creativity and change, as opposed to repetition and role learning.

Educational Program Implementation. A general plan for the implementation of pedagogical components is presented in the management section (Figure 15). A phased implementation schedule is presented in the economic feasibility section (Figure 9).

Management Feasibility

The primary question to be answered by the management subsystem is whether or not the management system that emerges over a five-year period can feasibly solve the organizational problems that the METEP model will generate. This section of the report suggests a conceptual model as a feasible point from which to begin the initial test system.

METEP is concerned with developing an organizational process that represents a suggested innovation in educational programming. In order to illustrate the improvement in educational programming that METEP represents, a comparison is made with the traditional programming system (which essentially is a closed one or one that is restricted to the academic community itself) and the METEP model which is designed as an open and responsive system in terms of environmental demands and changes.

The METEP model is based on the assumption that the nature of the clients (a series of groups whom the system is to serve) will change over time, that their demands will change, and this unit will, through appropriate monitoring procedures, sensitize the system to such changes.

In comparison to the traditional academic structure, the METEP organizational structure shows within it a series of new and/or changed functions. (e.g., client demand analysis, cost-effectiveness analysis). Program development in the METEP model will be an integrated process in terms of both the external environment as to client needs, running through the entire educational programming system to program review, and then looping back to research and development for program modification or financial analysis.

As to the budgeting aspects of the model, these will be done in terms of output characteristics through a planning, programming, budgeting process (PPBS) rather than the traditional way of making a budget (a line-item control budget in which detailed classification of objects of expenditure (inputs) and control of these items are emphasized).[1]

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[1] PPBS places emphasis on the end objective (outputs) and the control of costs needed to achieve these objectives. It focuses on the budget decision-making process, particularly on the problems relating to resource control, allocation and use. It is intended to bring about a more efficient and effective allocation of resources (staff, facilities, equipment). This is achieved through a careful appraisal of each program's needs in light of the program's objectives and outputs.

The entire METEP model is viewed as a learning system which on the basis of its experience can self-correct its operations.

The most glaring design deficiency at this point in time in the proposed management system is the lack of measurability of the initial test system. In terms of the prototype system recommended, metrics is several steps behind conceptualization. An essential part of providing some assurance of maintaining feasible design is, therefore, the provision during the implementation phase of the means to generate historical data which is required as a basis for redesign.

Management Information System. This section proposes a feasible management information system both to control the progress of students through the METEP structure and also to generate subsidiary management statistics for program diagnosis and analysis.

This section of the report is divided into four divisions.

Division One provides a preliminary description of general information system design principles to facilitate later introduction of operating constraints which we believe necessary for the success of this project at the present time.

Division Two reduces these general principles to application for the case at hand, the Model Elementary Teacher Education Program.

Division Three describes a basic information system proposed as a bench mark for this project.

Division Four provides possible extensions and variations from the bench mark case to illustrate alternate cost/benefit choices.

Economic Feasibility

This section attempts to determine the economic feasibility of the METEP project and to define the basic elements of the proposed fiscal planning and control subsystems. The concept of a flexible structure for institutionalizing change integrated with the concepts of formative and summative evaluation, PPB, cost-effectiveness analysis, and simulation modeling provide for an economically feasible teacher education program.

The Budgeting Subsystem. The METEP budget is a financial reflection of the project. It is the dollar statement of values and priorities, indicating both direction and speed of movement toward project goals. It is proposed that the success or failure of the METEP program not be measured explicitly in dollars, but rather by the degree to which structured goals are achieved.

Planning-programming budgeting (PPBS) is the technique proposed as the METEP budgeting process. It is a technique which emphasizes the end objectives (outputs) and the control of costs needed to achieve these objectives. It focuses on the budget decision-making process, particularly on problems relating to resource control, allocation and use. PPB promotes comparisons between the resource requirements of competing areas of the program. This is possible because resource alternatives and programs are expressed in a common denominator: the dollar.

The Accounting Subsystem. It is recommended that the proposed general framework of the accounting subsystem follow from the PPB subsystem. It incorporates the current public school practice of utilizing a "Federal Accounting System" with program accounting. Each fiscal transaction within the system is coded to: (1) indicate the purpose of the expenditure or action, i.e., the activity - Instruction; (2) describe the materials or services acquired i.e., the object - Salaries; (3) indicate the area or subsystem of the activity, i.e., the program area - Social Studies. This three-dimensional accounting subsystem will provide cost data necessary for PPB preparation and control.

Procurement Procedure. The METEP Associate Director of Administration is responsible for interfacing the project's accounting and procurement activities. He is also responsible for the following: procurement interface with the Assistant Dean for Administration, School of Education; procurement of items and services required for the implementation and operation of the project. Familiarization with the procedures established by the University for purchasing materials, equipment, supplies, and services; initiation of all METEP procurement actions.

Program area and subsystem coordinators will be responsible for the following: informing the associate director of procurement needs; providing the planning documentation required for anticipating most requirements.

Cost-effectiveness. Cost-effectiveness analysis, a process which relates cost and effectiveness (achievement data) will provide the above administrators with data which relate the cost and effectiveness of alternative courses of action. The data necessary for performing cost-effectiveness analysis is provided by the management information system and fiscal subsystems. The cost-effectiveness data will be used in developing area PPBs and in evaluating the design of the system. Cost-effectiveness may be analyzed at a program level, in each educational area within the program, or may be further broken down to be associated with costs of the various instructional alternatives (IAs) within the educational area. These costs may be both fixed and variable. Cost-effectiveness data can be used in making decisions pertaining to the deletion, addition, and/or alteration of instructional alternatives.

It is extremely important to point out that the cost-effectiveness data is a necessary but not sufficient base for making decisions. For example, an instructional alternative may have a low utilization rate and a high per student cost, while other IAs for the same PC may have high utilization rates and low cost. Based entirely on the cost/utilization data, consideration would probably be given to deleting the high cost alternative. However, examination of the type of student who successfully completes the high cost alternative may provide additional data which would indicate the desirability of maintaining the high cost instructional alternative. One of the inherent dangers of using cost-effectiveness analysis in education is the misuse of data by cost-oriented instead of student-oriented administrators.

Simulation Modeling. This section describes an attempt to further develop a computer simulated model of the METEP program. EDSIM 2 was the major model produced during the feasibility study.

The results of EDSIM 2 show that curriculum simulation allows the rapid examination of key theoretical and functional questions, and that a capability has been established for making better decisions as the METEP plan progresses.

As the METEP organizational process is further developed during Phase III, the simulator will be integrated into the proposed educational programming system. Interfaced with the financial analysis unit, the model provides a tool for forecasting and analyzing alternative allocation strategies in terms of program size, facility utilization, and economic feasibility (investment analysis).

Client Acceptability

This section of the report describes the reaction of a representative sample of interested lay people and professional educators to the METEP program. Data was collected by using three different methods; a reaction panel and a response to a questionnaire administered at client conference, obtaining reactions from directors of teacher certification departments in state departments representing selected regional areas of the United States, and a survey of reactions of students participating in the pedagogical feasibility studies. Reactions of students in the program are presented in each of the pedagogical reports.

Data collected during the client conference showed unqualified and qualified approval to the METEP program: the survey of the directors of teacher certification departments showed that there appears to be no problem for graduates of the METEP program in meeting certification requirements. The In-Service component in this report attempts two things: first, to design a tentative model for in-service program, and second, to survey the in-service needs of the elementary and public school teachers in the State of Massachusetts.

A tentative framework for an in-service model is proposed. The survey indicated a need to establish in-service seminars and workshops to improve skills and understandings in areas related to individualizing an educational program.

Evaluation and Research

This section of the report reviews some of the current developments, as well as the associated problems, in the area of evaluation and research methodology. Based on this review, a tentative framework for the evaluation model and a partial list of research questions is proposed.

The purpose of evaluation in this project is two-fold: first, it provides a way of making decisions concerning revision, refining, and discarding facilities, materials, and methods; this is referred to as "formative evaluation". The second purpose of evaluation is to determine the overall effectiveness of the project; this kind of decision making is referred to as "summative evaluation".

The purpose of the basic research component will be to add to the knowledge of the practices and methods of education. In order that useful, generalizable research results be obtained, attention will be given to the specification of treatment and experimental designs.

In order to facilitate the proposed evaluation model, it will be necessary to administer a diverse battery of tests to students entering the program and to define a variety of aptitude, achievement and personality variables; including tests to measure intelligence. To supplement this, biographical and high school records on students will be collected.

The purpose of formative evaluation will be to suggest improvements for the project while it is developing. The formative evaluators will observe the workings of the project, intervening as little as possible. Such evaluation will be in the form of teacher reports, student interviews and discussions, questionnaires, observations, test results, and outside professional views of produced materials.

The formative evaluation will have its effect in many areas of the program. Raw data collected by the Management Information System will be available in the data bank for research in the various content areas and for research in the areas of time studies and cost analysis. The cost benefit and cost effectiveness analysis will be integrated with the procedures designed as part of the Planning-Programming-Budgeting System.

Summative evaluation techniques will be applied in making an overall evaluation of the project. Whereas formative evaluation will be conducted primarily during the first two to three years of the project, the emphasis will shift in the third year towards summative evaluation. Data will be collected on large samples of graduating students from other teacher-training programs for purposes of comparison.

A number of evaluators have observed that global evaluation directed at a general criterion of teacher effectiveness has yielded few reliable and usable results. As a result, it is suggested that separate evaluation of components or objects of a project be made. One of the first steps then will be to specify the relevant components.

How will the model insure and maintain its relevance for teacher education in the 1970's?

This section describes an organizational process that will be responsive and adaptive to change. As the program is developed during Phase III, this function, described as client analysis, will be integrated into the proposed educational programming process. It is designed to systematically collect information relating to societal changes and the changing role of the elementary teacher. It will involve assessing client needs (this includes the different client groups affected by the program) and the major aspects of the environment (e.g. economic, political, sociological, ideological, technological, psychological).

SECTION II PEDAGOGICAL FEASIBILITY

SOCIAL STUDIES

Introduction

The social studies area is broadly divided into two sections related to two objectives:

1. To develop a comprehensive rationale.
2. To present in a concise manner the findings of the feasibility study.

In the initial portion of the report, under the heading of "Goals and Rationale", the philosophical orientation of the social studies area is presented. This section builds upon the presentation made in the previous report submitted to the Bureau of Research and offers a more comprehensive coverage of the rationale. Secondly, over one hundred performance criteria were developed. These criteria demonstrate the specific short term goals subsumed within the rationale. These criteria are located in Appendix A.

The remaining portion of the document is devoted to the presentation of salient aspects of the feasibility study. Each area within this part consists of both the presentation of data as well as conclusions. The components of this part are:

1. Schedule of Events
2. Methods of Selecting Performance Criteria and Instructional Alternatives
3. Sample Syllabus Entry
4. Tables and Explanations of Findings
    A. Pass - Fail frequency
    B. IA selection
    C. PC Evaluative Criteria
    D. PC Usefulness
5. Student Perceptions of Program
6. Recommendations
7. Requirements

Goals and Rationale. The world is in the midst of a social science revolution.

The profound problems of war, famine poverty, racism and ecological disaster loom large on the near horizon. Can man successfully overcome these problems? If so, what can the social studies in public education do to contribute to the amelioration of these modern day plagues?

We feel that a modern world needs teachers with distinctly different skills and attitudes than the world needed just ten or twenty years ago. We have developed a program in the social sciences which we feel addresses itself to the demands of the last third of the twentieth century.

Using society, the learner and the social sciences as data sources, we have derived the following institutional level objectives.

1. To comprehend, apply, analyze, synthesize and evaluate social science knowledge.
2. To use the skills and procedures of a social scientist.
3. To understand value orientations which affect world societies with emphasis on our society.
4. To create and maintain social studies as a meaningful part of a student's awareness of society.
5. To effectively utilize teaching skills.

Each of these objectives will be dealt with in the following areas:

1. Knowledge
2. Skills
3. Values
4. Improvisation and Sensitivity (Practicality)

Knowledge. We feel that this area is unique within social studies teacher education. Rather than setting forth an extensive list of areas in which the teacher should be knowledgeable, we have focused on the use of social science models. We are basing this pedagogical decision on three premises:

1. Given the knowledge revolution today, it is neither humanly possible nor desirable to expect prospective teachers of elementary social studies to recall a plethora of isolated factual data. As stated most recently in Carl Rogers' Freedom

to Learn, we must involve ourselves in the process, the "how" of learning.

3. Given the recent developments in the sophistication of both citizenry and knowledge, it is desirable for teachers and students to process knowledge on all levels of the cognitive domain. (Bloom, Taxonomy of Educational Objectives: Cognitive Domain)

Our interest with the knowledge component is to assess the ability of the prospective teacher to approach, conceptualize and present the content of the social sciences. If he is able to develop well organized thoughts pertaining to a complex subject, then it is our estimation that he will be able to understand and organize subject matter from elementary curricular materials.

The Leonard "Cultural Model: A Suggested Framework for Organizing Knowledge. Dr. David Leonard views "culture" (defined as "the totality of the means by which any human group lives") as having three components which together can incorporate any social phenomena:

1. Material (all natural items plus those things derived from them - food, shelter, tools, etc.)

2. Social (any relationship of individuals; any institutional arrangement)

3. Symbolic (includes languages, number systems, belief systems, values, rituals, the creative arts, etc.)

Using these three components as basic organizers gives one a framework for studying any aspect of human society. For instance, if one wished to consider "war", or a particular war, he could view it in material terms, social terms, and symbolic terms.

In order to simplify the examination of social phenomena (or general topics in the social studies), a list of "conceptual areas" are also provided which allow for the further breakdown of three broad components. Thus, the prospective teacher, using this model, has two alternatives for organizing knowledge: he can use the three components and break them down into his own areas of concern, or he can use the following matrix-type outline with its various conceptual areas:

CULTURAL COMPONENTS

CONCEPTUAL AREAS	Material	Social	Symbolic
Physical Environment			
Role of Individual and Groups			
Institutions			
Ethos			
Continuity and Change			
(Others)			

(Note: Ethos is defined as the "underlying value structure and belief systems which influence cultural reactions." "Others" refers to additional areas which the prospective teacher may feel are essential for organizing knowledge).

In order to use this form of the model, the teacher would consider the particular conceptual area underlying or influencing the social phenomena (topic) under consideration and examine it with respect to the components. For example, the influence of the "physical environment" on the Revolutionary War with respect to:

Material - e.g., rough terrain often restricted troop movement.
Social - e.g., bitter winters lowered morale.
Symbolic - e.g., spirit and confidence of outnumbered Yankees because much of the terrain was suitable for guerrilla tactics.

The prospective teacher will be urged to break the model down further for his own convenience in examining an analyzing topics. For instance, he might view "Institutions" in terms of aspects which are common to any institution: organization, continuity, role, and rules and regulations. Or a particular institution may be of major importance in the consideration of a specific topic. Consequently "Government" might be examined with respect to what it must provide people: justice, security, policy, and other services.

When overlapping of concepts or ideas occurs within the model, it should be viewed as an asset rather than a point of confusion. It enables a prospective teacher to realize that a single topic can be viewed from various directions and in numerous dimensions, thus enhancing one's overall perspective of the topic.

In cases where the prospective teacher feels that a particular topic should be considered within a conceptual area, but, for some reason it doesn't appear to "fit", the teacher should not feel constricted to the given format. Although this structure appears to incorporate most topics, it is not always successful and consequently the individual teacher is left to work his ideas where he feels they best apply.

The Leonard Model is just one of various models which can be used. The Leonard Model is particularly appropriate for viewing events. Other models may also be used. Leslie White developed an anthropological model based upon problems generally present in all cultures (i.e. Ideological, Attitudinal, Sociological and Technological).

In addition to the Leonard Model, the feasibility study employed the Kluckholn Model (from Variations in Value Orientations). This model concerned itself with viewing value orientations in different societies. The concepts within the model were defined and value orientations of the various cultures were analyzed in terms of the model. In addition, students were asked to explain when they would prefer one model over another.

Kluckhohn singles out five problems as crucial to all human groups:

1. What is the character of innate human nature? (human nature orientation)

2. What is the relation of man to nature (and super nature)? (man-nature orientation)

3. What is the temporal focus on human life? (time orientation)

4. What is the modality of human activity? (activity orientation)

5. What is the modality of man's relationship to other men? (relational orientation)

TABLE I

KLUCKHOLN'S MODEL

Orientation	Postulated Range of Variations					
Human Nature	Evil		Neutral	Mixture of Good & Evil	Good	
	mutable	immutable	mutable	immutable	mutable	immutable
Man-Nature	Subjugation to Nature		Harmony with Nature		Mastery over Nature	
Time	Past		Present		Future	
Activity	Being		Being in Becoming		Doing	
Relational	Lineality		Collaterality		Individualism	

These questions are graphically schemed in Table 1.

Definitions of Terms

1. Value Orientations -- are complex but definitely patterned (rank-ordered) principles, resulting from the transactional interplay of three analytically distinguishable elements of the evaluative process--the cognitive, the affective, and the directive elements -- which give order and direction to the ever flowing stream of human acts and thoughts as these relate to the solution of "common human" problems.

2. Mutable -- Capable of change or being changed in form or nature.

3. Being -- Similar to the Dionysian component which is defined as one in which there is a release and indulgence of existing desires. In the "being" orientation the preference is for the kind of activity which is a spontaneous expression of what is conceived to be "given" in the human personality -- it is a nondevelopmental conception of activity. It might be phrased as a spontaneous expression in activity of impulses and desires; yet care must be taken not to make this interpretation a too literal one.

4. Being-in-Becoming -- As in the "being" orientation, there is a stress on what the human being is rather than what he can accomplish. In this orientation, the idea of development is paramount. The kind of activity which has as its goal the development of all aspects of the self as an integrated whole is emphasized.

5. Doing -- Its most distinctive feature is a demand for the kind of activity which results in accomplishments that are measurable by standards conceived to be external to the acting individual. What does the individual do? What can he or will he accomplish? These are almost the primary questions in the American's scale of appraisal of persons.

6. Individualism -- Individual goals have primacy over the goals of specific Collateral or Lineal groups. This in no sense means that there is license for the individual to pursue selfishly his own interests and in so doing disregard the interests of others. It means simply that each individual's responsibility to the total society and his place in it are defined in terms of goals and roles which are structured as autonomous, in the sense of being independent of particular Lineal or Collateral groupings.

7. Lineal -- denotes a direct line of descent, succession, inheritance from parent to child. If the lineal principle is dominant group goals again have primacy.

8. Collateral -- implies a common ancestor, but not descended from each other. This orientation calls for a primacy of the goals and welfare of the laterally extended group. The group in this case is always moderately independent of other similar groups, and the problem of a well regulated continuity of group relationships through time is not highly critical. Unlike Lineal orientation, Collaterally defined roles do not relate to a definite position in a hierarchy of ordered positions.

The student analyzes material within the framework of this chart. Thus, analyzing various societal value orientations.

For example, until very recently the Spanish-American culture in the American Southwest demonstrated a clear Subjugation-to-Nature orientation. The typical Spanish-American sheepherder believed that there was little or nothing a man could do to save his flock in the face of adverse nature.

In a man-nature orientation, there is no real separation of man from nature and super nature. Certainly, aspects of Zen fit into this orientation. Finally, most Americans believe in a Mastery-over-Nature orientation. We irrigate deserts, halt disease and fly to the moon.

Time can be viewed similarly. Historically China was a Past oriented society, while Americans seem Future oriented.

Thus cultures and societies can be analyzed in terms of their value orientations within the framework of these five crucial questions. While political events might be studied within the Leonard Model, Value orientations can be studied effectively within the Kluckhohn framework. Certainly other models can and should be employed including those developed by the students themselves.

Not only is the model approach a viable strategy for dealing with the knowledge explosion, but it is a realistic way of perceiving the activities of a teacher. Given curricular concensus and topics, a teacher does not retrieve social science data from a computer-like memory bank. Rather the teacher undergoes a "tooling up" period. The model approach suggests not only a procedure for teachers to research an area, but itself becomes an assessment of the prospective teacher's ability to perform this activity.

Finally, using the model approach affords the opportunity of performing mental operations on all six levels of the taxonomy. The prospective teacher can be asked to demonstrate his ability in a specific area of a social science by showing his knowledge, comprehension, ability to apply, analyze, synthesize and evaluate. We believe this to be both a more sophisticated approach to the content as well as a more comprehensive assessment of the prospective teacher.

We believe that the utilization of social science models offer a significant learning opportunity for accomplishing social science institutional objectives one and two.

Skills. As a second area of competence, the prospective teacher must demonstrate an ability to use the basic tools and skills of both the social scientist and the teacher. The prospective teacher will be examined with respect to the following types of skills:

1. Analysis and Interpretation of:
    - A. Written social studies communications.
    - B. Audio and visual social studies communications.
    - C. Maps, globes, graphs and charts.
2. Locating and Using Information from Reference Sources.
3. Reocgnizing and Analyzing Social Science Problems.
4. Analyzing and Developing Curricula.

Each of these skills and its rationale for consideration will be discussed below.

1. Analysis and Interpretation.
    - A. Written Communications: The concern here is with the ability of the prospective teacher to identify main ideas, to recognize the author's purpose, and to determine whether biases exist within given social studies material. The teacher will also be expected to understand the rationale for the structure and format of newspapers, periodicals, textbooks, etc.
    - B. Audio and Visual Communications: Again, the concern is with the ability of the prospective teacher to identify, within social studies audio-visual media, main ideas, inferences and existing biases. The teacher will also be expected to organize the ideas presented using his chosen "model" and to indicate what use he would make

of the particular medium in the classroom.

C. Maps, Globes, Graphs and Charts: Since a basic skill of the social studies teacher is his ability to "read", interpret, and locate information on the above, competency in this skill is expected.

2. Locating and Using Information from Reference Sources.

As stated previously, the vast amount of knowledge found within the social studies makes it unreasonable to expect the prospective teacher to be well versed in every field or in all subjects. Rather, it is more realistic to stress the organization of social studies material and the skills necessary to locate such information. Consequently the prospective teacher is expected to demonstrate an ability to locate and use material from reference sources.

3. Recognizing and Analyzing Social Science Problems.

An essential aspect of one's handling of the social studies is an ability to identify situations which can cause conflict and to respond adequately to such situations. In order to succeed at this later task, a prospective teacher must be able to recognize the relative strengths of alternative solutions, to defend a chosen solution, and to realize that not all problem situations are perfectly soluble.

4. Analyzing and Developing Curricula.

The relationship between curricular theory and social studies is emphasized in this unit. The theoretical considerations of curriculum development, with a focus on the Ralph Tyler rationale, will be the unifying thread through this unit. We will examine such questions as the how to inculcate social science skills into a curriculum. The specialist level will amount to thirty hours in this crucial discipline-pedagogical relationship.

Value Component. The social studies teacher has frequently addressed the question of values that "other" societies have. The oriental version of "saving face" usually gets mentioned in a social studies course in one way or another. But taboo ground is rarely ventured onto. Naturally, the taboo area of our own values is to be avoided at all costs. Schools are to be "neutral."

We refute this assumption. We believe that schools not only should deal with our society's values, but in fact do. The teacher who speaks to freedom of speech, yet reels back in anguish at student protest; the teacher who teaches about democracy and its virtues, yet practices autocracy in the classroom; these teachers are modeling and thus teaching values. Our school environments saturate students with values, often in contradiction to what is verbalized in the classroom. We believe it is the peculiar responsibility of the social sciences to address itself to this issue. In our modern society, it is becoming increasingly necessary for citizens to be sophisticated in the value systems as well as aware of their underlying assumptions. We believe that schools must develop a coherent and conscious values program so that values education does not continue to be inconsistent and accidental program.

Several factors have combined to make such a values program feasible. The creation of the affective domain in the Taxonomy of Educational Objectives offers a theoretical construct for values curriculum. Secondly, the development of curricular materials which deal with value orientations assumes that teachers be skilled in this area. Oliver and Shaver have created such curriculum on the secondary level. Many of the anthropological and non-western materials for elementary social studies assume the presence of a teacher skilled in values. Bruner's, "Man - A Course of Study" and the "Greater Cleveland Social Science Curriculum" are both examples of such curricula. Raths, Harmin and Simon address this issue singularly and head on in their book Values and Teaching. The authors clearly indicate methodology and classroom strategy for attaining individual value clarification.

A final reason for preparing teachers to deal with values in curriculum can be related to present curricular theoretical deficiencies. As Ammons pointed out in 1964, there are many inoperant relationships between teachers and their classrooms on the one hand, and school objectives on the other. The assumption that teaching the chronology of American History in the classroom is directly related to a school's objective of developing good citizenship is at best tenuous. This suggests the need for classroom learning opportunities to be organized in relation to institutional objectives in the affective domain.

With these assumptions, we have infered the following values component objective:

1. To analyze and evaluate value orientations in world societies.

2. To analyze and evaluate American values.

3. To analyze, synthesize individual student values.

4. To be committed to values.

Sensitivity and Improvisation (Practicality) Component. One of the most consistently voiced student needs is that of "practical application" or "realistic" methods courses. The perception of many student teachers is that methods courses tend to be too theoretical. Students want (indeed need) practical tools to ease their anxiety. This component addresses itself to fulfilling that need and at the same time preparing skillful teachers.

Much of the activity within this component involves the prospective teachers learning and performing the tasks of a teacher. One portion of this component deals with planning activities, including lesson planning, defining learning opportunities and coordinating social studies objectives with those of art, science, the language arts and other disciplines.

By far, the largest emphasis is on actual classroom situations. Short practice teaching situations related to teaching concepts, maps, reading approaches and current events, among others, are included in this component. The preoccupation of prospective teachers with discipline in the classroom is the subject for other role playing learning opportunities. Reacting to student needs, using students as teachers and providing situations for student creativity are the subject of other performance criteria. Thus this component addresses itself to preparing the prospective teacher to become comfortable and skillful in classroom techniques. We believe it reduces student anxiety and prepares precise pedagogical teachers. It is in fact a bridge between course work and student teaching.

Design and Implementation of Pedagogical Feasibility Study

Description of Study As Performed. In their senior year, elementary education majors at the University of Massachusetts currently undergo an intensive professional preparation semester. This semester includes a two month period of methods courses in the various disciplines followed by a two month period of student teaching. It was during these first two months that the social studies feasibility program was run. From a list of all elementary education majors, 27 were randomly selected to participate. Their participation ran from September 28 to October 30, a five week period (The initial three weeks were spent in observation of schools and communities).

There were four members of the instructional staff. The members were selected for the areas of their greatest expertise. Three of the staff members were doctoral students and one was a candidate for the masters degree.

Each of the four components was tested in the feasibility study. Each received approximately one week within the study (6 to 9 hours).

The instructional alternatives were readily available to the students, multiple copies of all readings were on reserve in the library. According to the librarian, there was always an available copy on the shelf. The T.V. tapes and programmed instruction which were instructional alternatives for four performance criteria were also on reserve in the library. A television playback unit was readily available within the library.

At the first class meeting, a syllabus describing the social studies performance criteria was distributed. The syllabus also contained the degree of proficiency required to pass at the minimum and specialist levels. The various instructional alternatives were listed and described under each appropriate performance criteria. A sample syllabus entry follows:

> Skills Component October 10
>
> Performance Criteria #8
>
> Given three topics in the social studies, the student will write two objectives for each topic according to the criteria established by Ralph Tyler in Basic Principles of Curriculum and Instruction.
>
> Minimum - 4 correct
> Specialist - 6 correct

Instructional Alternatives

1. Lecture and discussion with Mr. Sadker. Reading for this class includes pages 1 and 2, parts of section F including pp 28-31; 43-48; 59-62.

   Class: 1 hour
   Reading: 40 minutes

2. T.V. tape and independent study. Reading for this includes pages 1 and 2; 28-31; 43-62.

   T.V. tape: 10 minutes
   Reading: 1 hour 20 minutes

Assignment Source:

Ralph Tyler, Basic Principles of Curriculum and Instruction.

After distributing the syllabus, there was a two hour explanation of the philosophy and rationale behind the Model Elementary Teacher Education Program. Those students who felt that they were able to perform successfully on the performance criteria were encouraged to take a pretest. All the participants took at least one pretest, many took more. Four class hours were set aside for the purpose of administering these tests. Needless to say, those students who mastered various performance criteria on the pretest were exempted from taking any instructional alternatives. Although it is interesting to note that many attended various instructional alternatives on a voluntary basis.

The only mandatory class was the first one. In this class the concept of models was explained. After defining what they were, it was explained that we were employing them for the purpose of defining the social science background of the students. After this introduction, which we felt was necessary, the students used the syllabus as their guide. From this point on, their program of learning opportunities was their own.

Time was set aside before classroom instruction to provide an opportunity for students to pass performance criteria. In addition, time was scheduled for this at a testing table during the day. This practice continued throughout the program. A chart indicating each students progress was posted near the testing area.

Table 2 indicates the outline of events.

TABLE 2

SCHEDULE, TOPICS AND INSTRUCTORS

P.C.	Area	Topic	Date	Time	Instructor
0	knowledge	introduction to models	Sept 29	1-3	Mr. Belsky
1	knowledge	identify Kluckholm concepts	Oct 1	1-3	Mr. Belsky
2	knowledge	identify Leonard concepts	Oct 3	1-3	Mr. Belsky
3	knowledge	choose applicable model	Oct 3	1-3	Mr. Belsky
4	knowledge	choose appropriate Leonard cell	Oct 6	1-3	Mr. Belsky
5	knowledge	explain relationship between cells	Oct 6	1-3	Mr. Belsky
6	skills	reading comprehension	Oct 7	8-9	Mr. Sadker
7	skills	using Bloom's taxonomy	Oct 7	9-10	Mr. Sadker
8	skills	stating objectives	Oct 10	8	Mr. Sadker
9	skills	writing a lesson plan	Oct 10	9	Mr. Sadker
10	skills	advantages of unit approach	Oct 10	9:30-10	Mr. Sadker
11	skills	describe principles of p.i.	Oct 14	1-1:30	Mr. Sadker
12	skills	define six curricular procedures	Oct 14	1:30-3	Mr. Sadker

TABLE 2 --Continued

P.C.	Area	Topic	Date	Time	Instructor
13	improvisation/ sensitivity	devise learning opportunities	Oct 16	1-3	Miss Faustine & Mr. Sadker
14	improvisation/ sensitivity	demonstrate reading approach	Oct 16	1-3	Miss Faustine
15	skills	identify map items	Oct 17	8-8:30	Mr. Sadker
16	improvisation/ sensitivity	demonstrate ability to teach maps	Oct 17	8:30-9	Mr. Sadker
17	improvisation/ sensitivity	plan 3-D Bulletin Board & art topics	Oct 17	9-10	Miss Faustine
18	improvisation/ sensitivity	respond to classroom problems	Oct 21	8-10, 1-2	Miss Faustine & Mr. Sadker
19	vlaue	identify value assumptions	Oct 22	10-12	Mr. Valone
20	value	identify values in child's stories	Oct 24	1-3	Mr. Valone
21	value	identify bias in articles	Oct 28	8-10	Mr. Valone
22	value	present evidence	Oct 29	8-10	Mr. Valone
		final questionnaire	Oct 31	8-10	Mr. Sadker

Selection of Performance Criteria

In examining the more than one hundred performance criteria included in the social studies portion of METEP, we were faced with two questions concerning selection of performance criteria for the feasibility study.

How can we examine all the areas for the feasibility study (i.e., How can we attain content validity?) and, how can we examine our new ideas being used in preparing social studies teachers (i.e., How can we attain construct validity?).

In dealing with the first question, we synthesized the four major components into sub-areas. Within each area there seemed to be clusters of performance criteria concerned with a particular topic. Thus, within the "skills component", we discovered performance criteria clustered in such areas as "reading skills", "audio-visual skills", "visual representations", and "curriculum". Performance criteria were selected to represent these clusters. Thus, we attempted to achieve content validity. The components and their cluster represented in the feasibility study are as follows:

1. Knowledge Component

   Content Cluster (Models)

2. Skills Component

   Reading Skills
   Audio Visual Skills
   Visual Representations
   Curriculum

3. Values Component

   Recognition of Values

4. Sensitivity and Improvisation

   Discipline Practicum
   Concepts Practicum

In addition to content concerns, performance criteria at both the specialist and minimum level were selected.

The second question, that of construct validity, revolved around three of the four components. The knowledge component was based on the use of models in the social sciences. Rather than asking numerous questions within the context of all the social sciences (e.g. history, sociology, economics, geography, political science, psychology, philosophy and anthropology) we have approached this area with the use of models. The filtration and classification of social science topics through a matrix of social science disciplines has enabled us to deal with a large number of topics, all the social science disciplines and all the levels of the cognitive domain. We can gauge the breadth and depth of a student in the social sciences with the use of these models. These models can in turn be used by the prospective teachers for their own teaching needs. Since this concept was a keystone in our program, eight hours of classroom instruction was devoted to accomplishing the performance criteria in this area.

The value component was also a new idea. Here, we were recognizing the crucial and predominant role that values play within the social studies. Rather than superficially treating them, we gave them major emphasis within a component. How perceptive would the students be of the pervasive nature of values in our society? How receptive would they be to analysis and evaluation of our basic tenets? These questions were crucial and six classroom hours were invested in determining the answers.

Finally, the sensitivity and improvisation area contained unique procedures in its heavy emphasis on student centered activity. From the teaching of difficult concepts to the dealing with discipline problems, the students' behavior was spotlighted. What special problems, pedagogically and administratively, would this create? Seven class hours of performance criteria in this area were used in the feasibility study to answer this question.

Thus, performance criteria for the feasibility study were selected to meet the demands of construct and content validity related to the social studies program.

The performance criteria selected from the knowledge component were focused on testing the utility of the model. The concepts were defined and interpreted. Analysis of cells within the model as well as application of social science readings to the model were used. The student was asked not only to explain the model, but to use it as well.

The skills component consisted of diverse performance criteria which dealt with social science skills, such as critical reading abilities and map interpretation. The remaining criteria were concerned with curricular procedures.

The improvisation and sensitivity component focused on the practicum experience. Lessons in map concepts and reading approaches were taught by the students. They were also asked to deal with discipline problems which were created through role playing. Planning lessons and activities were also included in this component.

The recognition of values in sophisticated articles as well as in children's stories composed the major focus of the values component. The recognition of bias and the presentation of evidence complete this section.

Selection of Instructional Alternatives

To determine which instructional alternatives to include in the feasibility study, we decided to use a representative sample of the entire program. The program places heavy emphasis on permitting students to choose between individual work or classroom interaction. To recognize this factor, a majority of the instructional alternatives in the feasibility study consisted of these alternatives. It is our assumption that these two very distinct alternatives appeal to two very different kinds of students. It is for this reason that we stressed the two extremes of the social interaction.

However, to avoid neglecting other alternatives included in our program, the feasibility study included samples of these alternatives as well. To represent visual alternatives, we have employed television video tape. Finally, we have also utilized an instructional alternative involving programmed instructional material. Most of these curricular materials are available on request.

The following is a frequency count of the instructional alternatives included in the social studies feasibility study.

Class (social interaction)	21
Independent Study (individual study)	20
Television	3
Programmed instruction	1

Educational Feasibility

Findings from Analysis of Quantitative Data. Performance criteria completion: In most cases, approximately 80% of the students mastered the performance criteria after taking one instructional alternative. Approximately 95% passed the performance criteria after two instructional objectives. In three of the performance criteria, a sizable number, approximately 82% passed the performance criteria without any instructional alternatives. Analysis of the three PC's involved revealed two explanations. PC #2 was too simple. With only five definitions to be recognized, some of which were fairly elementary, the students were able to successfully match the five Leonard concepts with their appropriate definitions. In the other two cases, PC's 6 and 15, the students' skills in map reading and written communication analysis were both developed to the extent that further work on this level within the course framework was not necessary. The reader is referred to Table 3 for information regarding the number of students passing PCs.

Conclusion #1. The majority of performance criteria could be mastered by the majority of students after completion of one instructional alternative. After the completion of two instructional alternatives, all but 8 of the performance criteria were successfully mastered by all the students. (totalling 95% of the students.)

Conclusion #2. PC 2 was simple enough to be completed without any instructional alternative. Therefore, it will have to be reconstructed.

Conclusion #3. PC's 6 and 15 were unnecessary for most students since this material was covered in previous course work.

TABLE 3

PERFORMANCE CRITERIA: RAW SCORE PASSES AT THE VARIOUS TIME SEQUENCES

PC		Pre[a] Test I		Post[b] Test I		Post[c] Test II	
		P[d]	NP[e]	P	NP	P	NP
1	The student will identify the definitions of all major concepts found in the Kluckhohn social science mode.	5	0	22	0		
2	The student will identify the definitions of all major concepts found in the Leonard social science model.	22	3	5	0	0	0
3	The student will explain in writing for what events or topics a particular model is appropriate.	0	0	23	4	4	0
4	Given four readings concerned with social studies, the student will choose two of these readings and identify and explain in writing which is the most appropriate cell of the Leonard model for each reading.	3	2	24	0	0	0
5	Using the two cells chosen in PC 4, explain in writing how they are related.	0	0	20	7	6	1
6	Having read a social studies passage, the student will answer questions in a multiple choice format concerning main ideas, inferences and author bias.	22	0	4	1	1	0

[a] Pre test - raw score passes before IA

[b] Post test I - raw score passes after one IA

[c] Post test II - raw score passes after two IAs

[d] P - pass grade

[e] NP - no pass grade

TABLE 3 ---Continued

PC		Pre Test I		Post Test I		Post Test II	
		P	NP	P	NP	P	NP
7	Given a list of objectives in the social studies, the student will write down after each objective to what level of Bloom's taxonomy it can most appropriately be assigned.	0	0	24	3	3	0
8	Given three topics in the social studies, the student will write two objectives for each topic according to the criteria established in "Basic Principles of Curriculum and Instruction", by Ralph Tyler.	1	0	14	12	6	6
9	The student will outline and explain the format for a lesson plan according to METEP social studies handout entitled "Lesson Plan Format".	0	5	25	2	2	0
10	The student will list and explain in writing five advantages for the unit approach (e.g. depth study) in social studies as defined by Bruce Joyce.	0	0	25	2	2	0
11	The student will list five principles of programmed instruction as enumerated by Educational Testing Service.	0	0	22	5	5	0
12	Given a sample curriculum, the student will identify and define the six processes in curricula building according to "Basic Principles" by Ralph Tyler.	0	0	21	6	5	1
13	The student will write three lesson plans for each of two social studies objectives (total of six lesson plans),each lesson plan containing a distinct and different learning opportunity.	0	0	22	5	5	0

TABLE 3 ---*Continued*

PC		Pre Test I P	Pre Test I NP	Post Test I P	Post Test I NP	Post Test II P	Post Test II NP
14	The prospective teacher will: 1) demonstrate the echo approach to teaching as defined by Dr. Durrel, including introduction, organization and supervision and 2) the prospective teacher will demonstrate a guided reading lesson, including the presentation and supervision elements.	0	0	26	1	1	0
15	The student will answer questions on a multiple choice test concerning identification of map symbols, use of a map legend, the identification of terrain features such as contour lines, and the location of grid coordinates.	21	2	6	0	0	0
16	The student teacher will teach a five minute lesson interpreting a map to role playing peers, including 4 of the 6 procedures on page 268 of Ralph Preston's _Teaching Social Studies in the Elementary School_.	0	0	25	2	1	1
17	Given a social studies topic, the student teacher will demonstrate her ability to use visual aids by: 1) writing three lesson plans incorporating art into her unit, and 2) construct in minature (12" by 18" paper) 2 3-D bulletin boards which support the topic.	0	0	22	5	3	2

TABLE 3 ---Continued

PC		Pre Test I		Post Test I		Post Test II	
		P	NP	P	NP	P	NP
18	While demonstrating a lesson to her peers, the prospective teacher will respond to classroom, discipline, value and content problems. (e.g.) 1. bloody nose 2. wetting pants 3. throw-up 4. ripped pants 5. crying 6. tripping over chair 7. hitting and shoving 8. stealing 9. consistant copying 10. ethnic remarks 11. comments about teacher 12. apathy 13. physical agitation 14. anti school comments 15. student-teacher value conflicts 16. religious questions 17. sex 18. questions about death 19. student manipulation	0	0	24	3	2	1
19	Given an article by Christopher Jencks on the Coleman Report the student will identify two basic assumptions about the way in which "our educational system" can be of value to the students.	0	0	24	3	2	1
20	Given two children's stories, one selected by evaluator and the other by the student, the student will identify one or more implicit or explicit values in each.	0	0	24	3	2	1

TABLE 3 ---Continued

PC		Pre Test I		Post Test I		Post Test II	
		P	NP	P	NP	P	NP
21 & 22	Given two accounts of China's "Great Leap", the student will decide which account is less biased and defend his choice through the presentation of five pieces of evidence.	0	0	18	9	6	3

Performance Criteria Usefulness. On all but one case, the majority of students responded affirmatively in relation to the utilitarian nature of the performance criteria. The prospective teachers recorded that they believed that the performance criteria were relevant to their teaching assignments. The ratio of students perceiving the performance criteria as useful to those perceiving them as not being useful (in all but one case), ranged from unanimous consent to 3 to 1.

In the one case in which the students responded that the performance criteria was not helpful, it concerned reading skills (PC 6). Generally, the knowledge component and the values component were rated as less relevant than the skills and sensitivity and improvisation component. Writing educational objectives and teaching a map lesson were unanimously rated as helpful.

Conclusion #4: While some components were perceived as more useful than others, the majority of students perceived all but one of the performance criteria as helpful.

Time Required to Complete Performance Criteria. One of the most intriguing findings of the study concerned the wide range of time needed by various students to complete the performance criteria. The highly individualistic nature of the student was demonstrated time and time again by the varying amounts of time needed to complete the performance criteria. While time ranges from 5 minutes to half an hour were not unusual, there were even more fascinating results. In one case, the range varied from 15 minutes to 4 or 5 hours. The average time in most cases was less than an hour. Reference is made in Table 4.

Conclusion #5: Although most performance criteria were completed in less than an hour, a surprising range of differences in the amount of time used was noted.

TABLE 4

PERFORMANCE CRITERIA: STUDENT RATINGS AND TIME TO COMPLETE

PC	Helpful	Not Helpful	Time To Complete (minutes) Range	Average
1	20	7	5-15	10
2	20	7	5-15	7
3	23	4	5-30	11
4	21	7	5-60	19
5	19	7	5-30	10
6	12	15	5-30	18
7	25	2	5-15	13
8	27	0	5-120	25
9	22	5	5-30	15
10	24	3	5-30	13
11	24	3	5-30	12
12	19	8	5-60	28
13	24	3	15-240	102
14	24	3	5-1.5	28
15	21	6	5-30	14
16	27	0	5-15	10
17	24	3	15-300	163
18	25	2	5-60	37
19	18	9	15-90	55
20	25	2	10-60	27
21&22	20	7	10-90	48

Effectiveness of Performance Criteria on the Specialist Level. In the design of the feasibility study, one of our objectives was to determine the proportion of students who mastered performance criteria appropriate to the specialist level. Specialist level objectives require a greater degree of expertise within the disciplines of social studies than does the minimum level. These performance criteria are more demanding in two respects. In the first place, many of the same performance criteria found on the minimum level are used, but demand a greater degree of proficiency. The second type are applicable only to the specialist level. This is the case especially within the curricular area. Performance criteria 6, 7, 8 and 15 demanded greater degrees of proficiency in order to achieve the specialist level. Performance criteria 12, on the other hand, was particularly on the specialist level, and only those prospective teachers who desire to acquire specialist status would involve themselves in this performance criteria. Although in the regular program the students would choose whether or not they desired to attain the specialist level, in the feasibility study we asked the students to attempt to attain this level of proficiency. The following relates these results:

PC	Students Attaining Specialist Level
6	7
7	15
8	7
15	16

The performance criteria dealing with the taxonomy and map reading were easier for the students to attain specialist level status than were those dealing with writing objectives and reading skills. Twenty-six of the twenty-seven students were able to complete PC 12, which was a specialist performance criteria which the non-specialist student would normally not take.

Conclusion #6: Although some of the specialist level performance criteria are more effective than others, all do discriminate among students. Thus specialist level demands are more difficult, and demand more effective student performance, than do minimum level performance criteria.

Selection of Instructional Alternatives

Given a free market place of learning opportunities, which ones would the majority of students choose? There were 541 such choices made by the students within the social studies area. The students overwhelmingly chose the classroom instructional alternative. Approximately 85% of all the choices possible were made in favor of classroom instruction. Independent study, programmed instruction and television together made up the difference in frequency of choice.

Times Offered	Alternatives	Total Number of Selections
21	Classroom Instruction	457
20	Independent Study	69
3	Television	8
1	Programmed Instruction	7
	Total	541

Although television, programmed instruction and independent study together were offered more frequently than was classroom instruction (24 to 21) most students chose the classroom. Several explanations for this can be made. Certainly habit is a variable. Having been a product of a class oriented educational establishment for fifteen years, this instructional alternative must have appeared to the students as a very comfortable one. From student comments recorded in this report, it was also a very efficient instructional alternative. They reported that by taking the classroom method, they were able to learn enough to master the performance criteria without doing any outside reading. A good portion of the students were involved in several METEP subject areas and explained that the work involved was extensive. The scheduled, planned and efficient class alternative fitted most successfully into their program. Finally, although multiple copies of programmed instruction, television tapes and readings were available, they were generally confined to library reserve use. The lack of availability of these resources for home use might have added to the attractiveness of these alternatives. See Table 5.

Conclusion #7: An overwhelming number of students chose the class instructional alternative rather than the others offered.

TABLE 5

FREQUENCY OF INSTRUCTIONAL ALTERNATIVE CHOICES

(N/A = Not Applicable Because the Alternative Was Not Offered for That Particular PC)

PC		Seminar	Class	Independent Study	TV
1	The student will identify the the definitions of all major concepts found in the Kluckhohn social studies model.	NA	20	7	NA
2	The student will identify the definitions of all major concepts found in the Leonard social science model.	NA	10	3	NA
3	The student will explain in writing for what events or topics a particular model is appropriate.	NA	25	2	NA
4	Given four readings concerned with social studies, the student will choose two of these readings and identify and explain in writing which is the most appropriate cell of the Leonard model for each reading.	NA	20	4	NA
5	Using the two cells chosen in PC 4, explain in writing how they are related.	0	26	1	NA
6	Having read a social studies passage, the student will answer questions in a multiple choice format concerning main ideas, inferences and author bias.	3	NA	5	NA

TABLE 5 --Continued

PC		Seminar	Class	Independent Study	TV
7	Given a list of objectives in the social studies, the student will write down after each objective to what level of Bloom's taxonomy it can most appropriately be assigned.	NA	26	3	3
8	Given three topics in the social studies, the student will write down after each objective to what level of Bloom's taxonomy it can most appropriately be assigned.	NA	26	3	3
9	The student will outline and explain the format for a lesson plan according to METEP social studies handout entitled "Lesson Plan Format".	NA	26	2	NA
10	The student will list and explain in writing five advantages for the unit approach (e.g. depth study) in social studies as defined by Bruce Joyce.	NA	25	4	NA
11	The student will list five principles of programmed instruction as enumerated by Educational Testing Service.	7	22	NA	NA
12	Given a sample curriculum, the student will identify and define the six processes in curricula building according to "Basic Principles" by Ralph Tyler.	NA	26	2	2

TABLE 5 --Continued

PC		Seminar	Class	Independent Study	TV
13	The student will write three lesson plans for each of two social studies objectives (total of six lesson plans) each lesson plan containing a distinct and different learning opportunity.	NA	25	2	NA
14	The prospective teacher will demonstrate 1) the echo approach to teaching as defined by Dr. Durrell, including introduction, organization and supervision or 2) The prospective teacher will demonstrate a guided reading lesson, including the presentation and supervision elements.	NA	27	0	NA
15	The student will answer questions on a multiple choice test concerning identification of map symbols, use of a map legend, the identification of terrain features such as a contour lines, and the location of grid coordinates.	NA	7	2	NA
16	The student teacher will teach a five minute lesson interpreting a map to role playing peers, including 4 of the 6 procedures on page 268 of Ralph Preston's "Teaching Social Studies in the Elementary School".	NA	22	6	NA

TABLE 5--Continued

PC		Seminar	Class	Independent Study	TV
17	Given a social studies topic, the student teacher will demonstrate her ability to use visual aids by: a) writing three lesson plans incorporating art into her unit, and b) construct in minature (12" by 18" paper) 2 3-D bulletin boards which support the topic.	NA	25	4	NA
18	While demonstrating a lesson to her peers, the prospective teacher will respond to classroom, discipline, value and content problems.(e.g.) 1. bloody nose 2. wetting pants 3. throw-up 4. ripped pants 5. crying 6. tripping over chair 7. hitting and shoving 8. stealing 9. consistant copying 10. ethnic remarks 11. comments about teacher 12. apathy 13. physical agitation 14. anti school comments 15. student-teacher value conflicts 16. religious questions 17. sex 18. questions about death 19. student manipulation	NA	27	2	NA
19	Given an article by Christopher Jencks on the Coleman Report the student will identify two basic assumptions about the way in which"our educational system" can be of value to the students.	NA	25	3	NA

TABLE 5--Continued

PC		Seminar	Class	Independent Study	TV
20	Given two children's stories, one selected by evaluator and the other by the student, the student will identify one or more implicit or explicit values in each.	NA	22	5	NA
21 & 22	Given two accounts of China's "Great Leap", the student will decide which account is less biased and defend his choice through the presentation of five pieces of evidence.	NA	18	9	NA

Instructional Alternative Usefulness. The prospective teachers participating in the social studies program were asked to rate the instructional alternative that they chose. They used a five point scale where 1 was "excellent" and 5 was "poor". Most of the responses were in the "very good" and "good" range. (i.e. 2-3)

Instructional Alternative	Ratings Average Rating	Rating Range
Class	2.3	1-5
Independent Study	2.5	1-5
Television	2.3	1-3
Programmed Instruction	2.0	1-3

Two aspects of these results standout. The first is the favorable ratings. One explanation might allude to a more or less equality of quality among the alternatives. The other explanation would be that students chose the instructional alternative they believed most applicable to themselves as individuals. This self selection process resulted in a self satisfying technique which created favorable perceptions of instructional alternatives.

The second aspect was the proximity of the ratings of each instructional alternative. The average rating range was 2.0 - 2.5. This is extremely close when scored by 27 students on a five point scale. Both of the reasons given above, i.e. equality and the self-selection phenomena could also be applied to explain the narrow range of differences among the average ratings of instructional alternatives.

Conclusion #8: The instructional alternatives were given favorable and fairly similar ratings by the students. The ratings ranged from "good" to "very good."

Time Needed to Complete Instructional Alternatives. The time that the students needed within each instructional alternative was less than anticipated. Students involved in the class related that they did not have to read the assignments in order to perform the performance criteria. Those involved in other instructional alternatives related that the time needed to complete them was also less than we expected.

As some students read more thoroughly in the independent study alternative, the range widened. Yet the average time within the instructional alternatives was comparable to the time spent in class. An hour spent in class was approximated by an hour spent in another instructional alternative. This is highly desirable since it helps to create a competitive choice for the students. Thus a student realized that if he chose independent study rather than class (or vice versa) there was no time gained. He seemed to select a specific alternative for reasons other than time. See Table 6.

Conclusion #9: The time anticipated within each instructional alternative was greater than the time actually needed in the feasibility study.

Conclusion #10: The time involved within instructional alternatives for a given performance criteria were generally equal, although some students varied significantly from the mean.

TABLE 6

INSTRUCTIONAL ALTERNATIVES: STUDENT RATINGS AND TIME TO COMPLETE

PC	IA	N	Students' Ratings Rating Range	Students' Ratings Rating Average	Time to Complete (hrs.) Time Range	Time to Complete (hrs.) Time Average
1	Independent Study	7	2-3	2.2	1-2	1.6
	Class	20	1-3	2.1	2	2
2	Independent Study	3	2	2.0	.25-2	1.05
	Class	10	2-5	2.5	2	2
3	Independent Study	2	2	2.0	.5-1	.75
	Class	25	1-3	1.9	2	2
4	Independent Study	4	1-2	1.3	1-2	1.16
	Class	20	1-3	1.9	1	1
5	Independent Study	1	3	3.0	1	1
	Class	27	1-3	2.1	1	1
6	Independent Study	5	2-3	2.8	.5-1	.75
	Class	3	2-3	2.7	.5	.5
7	Independent Study	3	1-2	1.7	.5	.5
	Class	26	1-4	2.2	1	1
	TV	3	1-2	1.7	.25	.25
8	Independent Study	2	2	2.0	.5-1	.75
	Class	27	1-3	1.8	1	1
	TV	3	2-3	2.3	.16-.5	.31
9	Independent Study	2	2	2.0	.5-1.5	1
	Class	26	1-4	2.0	.5	.5
10	Independent Study	4	2-4	3.5	.5-1	.8
	Class	25	1-4	2.4	.5	.5
11	Program Instruction	7	1-3	2.0	.16-1	.5
	Class	22	1-5	2.2	.5	.5

TABLE 6--Continued

PC	IA	N	Students' Ratings Rating Range	Students' Ratings Rating Average	Time to Complete (hrs.) Time Range	Time to Complete (hrs.) Time Average
12	Independent Study	2	3	3.0	1.5-2	1.75
	Class	26	1-3.5	2.5	1.5	1.5
	TV	2	3	3.0	.2-.5	.35
13	Independent Study	2	3	3.0	.5-1.5	1
	Class	25	1-4	2.1	2	2
14	Independent Study	0	0	0	0	0
	Class	27	1-4	2.2	.25	.25
15	Independent Study	2	2-4	3.0	.25-.5	.37
	Class	7	1-5	2.7	.5	.5
16	Independent Study	6	2-3	2.5	.16-1.5	.9
	Class	24	1-4	2.3	.5	.5
17	Independent Study	4	1-3	2.2	1.0	1.0
	Class	25	1-3	1.5	1.0	1.0
18	Independent Study	2	2	2.0	3.0	3.0
	Class	27	1-4	2.2	3.0	3.0
19	Independent Study	3	3	3.0	1.0	1.0
	Class	25	1-5	3.2	2.0	2.0
20	Independent Study	5	2-4	3.4	1-1.5	1.3
	Class	22	2-5	3.1	2.0	2.0
21 & 22	Independent Study	9	2-5	3.4	1-1.5	1.3
	Class	18	2-5	3.2	2.0	2.0

Findings From Analysis of Qualitative Data

Students' Comments. At the completion of the feasibility study, a final questionnaire was completed by the students. They were asked to answer it on a voluntary basis and due to this fact as well as the fact that several students did not choose the classroom instructional alternative for the performance criteria being dealt with at this time, only 23 of the 27 participants filled out the questionnaire. The questionnaire asked for annecdotal as well as definitive responses.

The students' comments were interesting as well as informative. The initial three questions involving the relevance of the program received relatively uniform and affirmative comments. The next question asked the students to indicate why they had chosen a particular mode of instruction. The classroom instructional alternative was the one most frequently chosen. One reason that was often cited was efficiency. "I was in several METEP sections", wrote one girl, "and I felt that the classes would be more convenient. I just didn't have time to do the readings, view the tapes, etc." Another wrote, "It was the fastest and easiest".

Other factors affected the student's choice of instructional alternatives. "The class offered the opportunity to exchange ideas whereas independent study did not". Another wrote "classes were easier and more interesting. I prefer personal interaction and feedback rather than a book or sheets of mimeo paper." One student wrote succinctly, "I am an audio learner". Perhaps an encompassing and comprehensive statement written by one of the students would be an effective manner to conclude this area. "I liked the classes because of three reasons:

1. more appropriate to my nature of study,
2. convenient for me,
3. habit forming.

Question 5 asked the students to comment on the relevance or helpfulness of each of the components. Two of the four areas were answered in a somewhat conflicting commentary. While many of the students acknowledged the usefulness of the knowledge component for their personal use, 34% of those responding said that they did not feel that this component was helpful. "I learned a lot from this unit," writes a male undergraduate, "however I cannot seem to use it in social studies for primary grades". "It was relevant for me as a student but not as a teacher". One student in the group touched an optimistic note as he reported, "It seems more relevant now after thinking about it than it seemed at the time". The 66% who felt it was helpful submitted comments like these:

> "Rather exciting idea which can be used in the classroom."
>
> "The models were very useful and relevant and I plan to use part or all of this in the classroom".
>
> "A good way of studying values, events, and cultures."
>
> "...fantastic approach to thinking and teaching..."
>
> "It offers a teacher flexibility in breaking down a subject."

The values component received very controversial comments. While 13% of the participants rated this component as excellent, 29% rated it as weak. This was by far the largest percentage of students to record any component as weak. While both the knowledge and values components required some degree of intellectual sophistication, the students seemed less able to deal successfully with the values component. One student who felt that she benefited from this area wrote, "It should have come a lot earlier in the curriculum. It is very important to realize your purpose in teaching before you begin." Another worte, "It made me reevaluate more substantially my philosophy and values as far as education and my general style of life are concerned." "It was a unique class", writes another, "and the ideas brought up have caused me to think about teaching values."

Yet the majority of those responding were not pleased with the values component. One girl remarked concisely, "echh!" Those more verbal if less expressive students responded with comments like this one: "The values helped me, as a person, to look at things in a somewhat different light"; however, I didn't find it useful for elementary education". "I found these lectures irrelevant to me as an elementary Ed teacher." One student reacted, "The teacher as a person is to be admired. He is devoted to a cause, but I am not sure whether or not I could apply anything I Learned to teaching." A less satisfied student wrote, "I thought it was a lot of propaganda and I got very little from it."

The two remaining components, skills and sensitivity and improvisation, received an overwhelming majority of positive comments. The most frequently state opinion about the skills component is reflected in the following quotations, "This was excellent and relevant. This is material that I will use for a long time." "This section was the best. It seemed most applicable for information that we can use as a teacher." "...practical knowledge and what I was really hoping to find in the methods courses." The one girl who rated this as weak wrote, "I didn't get much out of it". Yet the other students were unanimous in their praise.

As with the skills component, improvisation and sensitivity received favorable reactions. "Role playing was great. There should be more of it." "...should be a prime consideration of methods courses." "This was the only class that actually allowed us to give a lesson." "The most realistic for me". Although most comments were favorable, those that weren't had a single theme. "It was too artificial". "Teaching students not college peers, would have been more beneficial."

In asking the students to rate METEP social studies with non-METEP social studies, the population responding was naturally reduced. The question was prefaced by a statement requesting only the students with adequate information in relation to non-METEP social studies to respond. The 59% response was uniform in agreeing that METEP was superior. The non-METEP program, termed the "ed block", is compared to the METEP program in the following remarks:

> "This program (METEP) is a giant step forward."
>
> "(This program) is much better since there was actual exchange between student and teacher".
>
> "This program is more stimulating."
>
> "I like the idea of alternatives."
>
> "Better and a lot more work."
>
> "I think this program is better because we were more active."

Recommendations

Many of the following recommendations are related to the specific conclusions formulated as a result of the feasibility study.

1. Some of the performance criteria should be re-examined. In some cases the performance criterion might be poorly constructed (PC 2 cited in Conclusion 2). In other cases the criterion might be unnecessary (PCs 6 and 15, cited in conclusions 3 and 4).

2. Ample time should be provided for students. Individualization creates differences in the time necessary for students to complete instructional alternatives and performance criteria (conclusions 5,7, and 10).

3. Some aspects of the program might be more effective if they followed teaching experience. The Values Component and the specialist level seem to require a greater degree of sophistication than do the other areas.

4. Time estimates for completion of instructional alternatives seem to be too great. These estimates should be revised.

5. Professional staff and physical facilities should be provided for implementation of this program (See next section).

6. The rationale format and design of the program, although in need of some revision, are basically sound.

7. Based on student response, a careful explanation of the assessment nature of the knowledge component should be made to the student. In addition, performance criteria related to methods of using the model approach in an elementary classroom should be constructed.

8. Based on student response, more performance criteria related to methods of using values in the classroom should be developed.

9. Based on student response, elementary students should be used in the practicums within the improvisation and sensitivity component.

Requirements

During the implementation of the feasibility study, it became apparent that in order to sustain a concerted and total METEP Program, with a sizeable number of students, certain modifications in resources would have to be made.

The physical needs are two fold. First, an area large enough to service students must be established. The one office and one classroom used during the study were actually inadequate for the 27 students involved. If a greater and more realistic number of students will be serviced, it is apparent that present physical space will be inadequate. The needs of the students participating in the feasibility study suggest five specific areas:

1. Classroom Area
2. Independent Study Area (i.e. library)
3. Conference Area (for faculty student interchange on a one to one basis or in a seminar situation)
4. Laboratory (where media IAs as well as audio-visual curricula materials can be explored.)
5. Testing Area (where students can enter at their own convenience and be assisted in taking any performance criterion)

Time and time again during the feasibility study it was obvious that "living space" appropriate to the multi faceted nature of the program was needed.

The second type of physical need revolves around the fourth area, i.e. the laboratory. A well equiped social studies laboratory today requires a good many items of both the "software" and "hardware" variety. Projectors, television and graphics equipment illustrate some of the "hardware" needs. Film loops, maps, and transparencies comprise part of the "software" needs. A more detailed account is presented in Appendix B.

The second area of requirements is concerned with human resources. The heavy amount of administrative and organizational kinds of paper work demand a full time secretary. The offering of various instructional alternatives to varying numbers of students speaks to the need for several faculty members.

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APPENDIX A

Evaluation Criteria for Performance Criteria Used in the Feasibility Study

PC 1: The student will identify the definitions of all major concepts found in the Kluckhohn social science model.

Evaluation: The student must match words or phrases in one column with the definitions presented in another. The definitions are derived from Kluckhohn's book and a critique sheet of the correct responses is available. All eight must be matched correctly for a pass grade.

PC 2: The student will identify the definitions of all major concepts found in the Leonard social science model.

Evaluation: As in PC 1, a matching examination involving concepts defined by Leonard. A critique sheet is used and a perfect score of 5 matches is required for a pass grade.

PC 3: The student will explain in writing for what events or topics a particular model is appropriate.

Evaluation: The evaluation consists of two parts. The first part asks the student to explain at what times they would use a specific model. Secondly, specific social science phenomena were presented, and the student asked to choose the model most applicable to analyzing that event. A critique sheet is used to judge the accuracy of the student responses. Two out of three responses must be correct for part two, and both responses must be correct for part one in order for a student to pass.

PC 4: Given four readings concerned with social studies, the student will choose two of these readings and identify and explain in writing which is the most appropriate cell of the Leonard model for each reading.

Evaluation: The explanation of the student for placing a reading in a specific cell is evaluated by a faculty member. Both explanations are evaluated in terms of the logic and perceptions presented by the student. Both explanations must be approved to receive a pass grade.

PC 5: Using the two cells chosen in PC 4, explain in writing how they are related.

Evaluation: As in PC 4, the evaluator judges the student response in terms of logic and perception of the presentation.

PC 6: Having read a social studies passage, the student will answer questions in a multiple choice format concerning main ideas, inferences and author bias.

Evaluation: The passages are selected for a Graduate Record Exams book. The key in the book is used to determine correct answers. Minimum level was seven out of ten correct. Specialist level was nine out of ten correct responses.

PC 7: Given a list of objectives in the social studies, the student will write down after each objective to what level of Bloom's taxonomy it can most appropriately be assigned.

Evaluation: Given ten objectives, the student was asked to recall and record the appropriate taxonomical level for each objective. Minimum level was seven out of ten. Specialist level was nine out of ten.

PC 8: Given three topics in the social studies, the student will write two objectives for each topic according to the criteria established in "Basic Principles of Curriculum and Instruction", by Ralph Tyler.

Evaluation: The student was given three topics and asked to write two objectives for each. According to the criteria, the objectives had to be:

1) stated in terms of the student, with
2) behavior, and
3) content.

A minimum level was four out of six correct. A specialist level was six out of six correct.

PC 9: The student will outline and explain the format for a lesson plan according to METEP social studies handout entitled "Lesson Plan Format".

Evaluation: The lesson plan had nine areas that had to be cited and explained to a faculty member's satisfaction. All nine parts had to be satisfactory for a pass grade.

PC 10: The student will list and explain in writing five advantages for the unit approach (e.g. depth study) in social studies as defined by Bruce Joyce.

Evaluation: As in PC 9, the student must cite and explain the five advantages of the unit approach. His responses were compared to a critique sheet based on the advantages cited by Joyce.

PC 11: The student will list five principles of programmed instruction as enumerated by Educational Testing Service.

Evaluation: As in PC 9, the student must cite the five principles of programmed instruction. His responses were compared to a critique sheet based on the principles cited by the Educational Testing Service.

PC 12: Given a sample curriculum, the student will identify and define the six processes in curricula building according to "Basic Principles" by Ralph Tyler.

Evaluation: The students were presented with a sample curriculum and asked to identify and explain the six processes illustrated. This is strictly a specialist level PC. All six processes must be successfully identified and explained to the satisfaction of a staff member.

PC 13: The student will write three lesson plans for each of two social studies objectives (total of six lesson plans), each lesson plan containing a distinct and different learning opportunity.

Evaluation: The students must satisfy two criteria. His lesson plans must include all the areas cited in PC 9. Secondly, it must include reasonable and distinct learning opportunities to be determined by an evaluator. Five out of six must be accurate to pass.

PC 14: The prospective teacher will:

1) demonstrate the echo approach to teaching as defined by Dr. Durrell, including introduction, organization and supervision.

2) demonstrate a guided reading lesson, including the presentation and supervision elements.

Evaluation: The student demonstrated the performance criteria. The observer evaluated the performance according to a critique sheet. The sheet covers elements of presentation and supervision. Either reading approach is acceptable to pass. All of the elements on the critique sheet must be satisfactorily included in the student's presentation. The staff member evaluates the performance.

PC 15: The student will answer questions on a multiple choice test concerning identification of map symbols, use of a map legend, the identification of terrain features such as contour lines, and the location of grid coordinates.

Evaluation: Ten questions were developed dealing with symbols, location and the legends found on maps. Seven out of ten correct responses were needed for a minimum level. Nine out of ten were needed to pass at a specialist level.

PC 16: The student teacher will teach a five minute lesson interpreting a map to role playing peers, including 4 of the 6 procedures on page 268 of Ralph Preston's Teaching Social Studies in the Elementary School.

Evaluation: A staff member observes and rates the student's performance using a critique sheet.

PC 17: Given a social studies topic, the student teacher will demonstrate her ability to use visual aids by:

1) writing three lesson plans incorporating art into her unit.

2) construct in minature (12" by 18" paper) 2 3-D bulletin boards which support the topic.

Evaluation: The lesson plans must include all the areas in PC 9 as well as demonstrating three distinct art activities. The bulletin board plans are expressive objectives. The handing in of these two plans is rated as a pass. All aspects of the lesson plan format as well as 3 art activities must be presented for the student to pass the first part of this performance criteria.

PC 18: While demonstrating a lesson to her peers, the prospective teacher will respond to classroom, discipline, value and content problems. (e.g.)

1) bloody nose
2) wetting pants
3) throw-up
4) ripped pants
5) crying
6) tripping over chair
7) hitting and shoving
8) stealing
9) consistant copying
10) ethnic remarks
11) comments about teacher

12) apathy
13) physical agitation
14) anti school comments
15) student-teacher value conflicts
16) religious questions
17) sex
18) questions about death
19) student manipulation

Evaluation: The student is rated on capability and poise. This rating is made by an evaluator.

PC 19: Given an article by Christopher Jencks on the Coleman Report the student will identify two basic assumptions about the way in which "our educational system" can be of value to the students.

Evaluation: The student's responses are compared to an assessment of the Jencks article made by the faculty. He must cite at least two assumptions to pass.

PC 20: Given two children's stories, one selected by evaluator and the other by the student, the student will identify one or more implicit or explicit values in each.

Evaluation: The evaluator judges the perceptiveness and rationale of the student's response. Both stories must be correctly analyzed in order to pass.

PC 21
&22: Given two accounts of China's "Great Leap", the student will decide which account is less biased and defend his choice through the presentation of five pieces of evidence.

Evaluation: One account is extremely biased, being written by a right of center American group. This account must be selected as the more biased in order for the student to pass PC 21.

In order to pass PC 22, the student must present five pieces of evidence. This evidence must support his choice and be logically deduced from the account itself.

COMPLETE LIST OF PERFORMANCE CRITERIA

Social Studies

Performance Criteria as of January 1, 1970

Knowledge Component

Minimum & Specialist

Content Cluster

0101 The prospective teacher will select one major topical concern found in an elementary or college social studies textbook and define all major concepts in the selection.

0102 The student will define all major concepts found in the Leonard social science model and give examples of these concepts.

0103 The prospective teacher will provide a rationale for the use of a chosen "Model". The rationale will include an explanation of when it is best to use the "Model" and why it is best to use it at that time.

0104 The prospective teacher will analyze orally and in writing: (a) a single conceptual area chosen by the candidate: (b) a second conceptual area chosen by the evaluators; within the framework of a given social studies model.

0105 Given four readings concerned with social studies, the student will choose two of these readings and identify and explain in writing which is the most appropriate cell of the Leonard model for each reading.

0106 Using the two cells chosen in the models explain in writing how they are related.

0107 The student will list six cultural components which have affected American Education.

0108 From the list derived in 0107, select three and explain how these cultural components have affected American culture.

0109 The prospective teacher will apply particular "components" and conceptual areas of the model selected by the evaluations to four other topics chosen at random.

0110 Given one conceptual area chosen at random by the evaluator, the student will compare and contrast two similar social phenomena.

0111 The student will evaluate two models with respect to three topics chosen by an evaluator.

Contemporary Education Cluster

0112 Given a list of 10 social issues which affect contemporary education, the student will select two issues and for each issue write one paragraph which describes the historical antecedent of the issue.

0113 From the list of 10 social issues, two will be selected and the student will be asked to write one paragraph for each issue explaining the cultural force in society responsible for the issue.

0114 The student will list six educational innovations and write down the rationale for each.

0115 To list four of the recent trends in the social studies.

0116 To read elementary school or social studies journals.

Skills Component

Minimum

Reading Skills Cluster

0201 Given a social studies textbook, the student will write the purpose for: Preface, Introduction, Appendix, Index.

0202 Given copies of the N.Y. Times and N.Y. News of same date, students will analyze and explain their formats.

0203 Having read a social studies passage, the student will answer multiple choice questions concerning general content.

0204 Having read three social studies passages, to list main ideas by sentence (after being told the number of main ideas present) - (these will be easy in nature).

0205 Having read three social studies passages to list main ideas by sentence (after being told the number of main ideas present) - (these will be more difficult than 0204).

0206 Given a number of social studies passages, to identify the purposes or intentions of the author by passing a multiple choice test.

0207 Given three social studies passages, to underline phrases and clauses which may demonstrate author bias.

Audio-Visual Cluster

0208 Given three types of audio-visual communications, (e.g. short documentary, film, filmstrip, videotape, audio tape) to list the main ideas for each.

0209 Given three types of audio-visual communication to list existing biases for each.

0210 Given three types of audio communication, explain how each can be used in a class.

0211 Given a topic and one day to prepare, the student will prepare a tape recording to be used in a social studies lesson.

Visual Representations Cluster

0212 To get 70% of the answers or more correct on a test concerning identification and location of items on a map.

0213 Given a multiple choice test concerning the interpretation of charts, the student will get 70% or more correct.

0214 Given a multiple choice test concerning the interpretation of graphs, the student will achieve a score of 70% or higher.

Reference Cluster

0215 Given a multiple choice test concerning the ability to locate information in a library, the student will get 80% correct.

0216 Given a specific research topic, the student will delineate the steps used in locating resources relevant to the topic, including the letters of the resources.

0217 Given the research topic in 0216, a bibliography for this topic will be constructed including at least six types of resources and 25 entries.

Curriculum Cluster

0218 When given an objective (and information regarding the classes experiences which might relate to the level of the objective) the student will be able to name the level of the objective using Bloom's categories.

0219 Given a list of social studies objectives written in the affective domain, the student will be able to write the level of the objective in the affective domain.

0220 Given a topic in the social studies, the student will write six (6) objectives, stated in terms of Tyler.

0221 To evaluate a list of social studies objectives given for a particular school as either appropriate or not appropriate.

0222 Given an objective, the student will describe 12 varieties of learning opportunities which could be employed (e.g. lecture, field trip, panel discussion, socratic, role play, --)

0223 Given background information for a school and a social studies objective, to construct a lesson plan.

0224 Given a background information sheet and a chapter in a social studies textbook, the student will derive objectives and outline a unit designed to attain those objectives.

0225 The student will write down six major curriculum procedures and describe their materials including format and general objectives.

Specialist

Reading Cluster

0226 Having read a passage selected by evaluators rating it as extremely difficult, the student will list the main ideas, the number of which he already knows.

0227 Given descriptions of two specifically defined "populations", the student will design a newspaper format for each group including - Front page, editorial, society, feature article, comics, pictures, sports.

Visual Cluster

0228 Given four political cartoons, explain in writing the underlying theme of three of them.

0229 Given four political cartoons, explain in writing which one contains a different theme and explain that theme.

Audio Visual Cluster

0230 Using "model" previously chosen, organize knowledge and ideas found in three types of audio-visual communication.

Research Cluster

0231 After completing PC 0207, indicate which inferences are proven, not proven, unable to judge, using the entire context as criteria.

0232 For each of the 25 bibliographical entries in 0217, the student will write a short rationale for its inclusion.

Curriculum Cluster

0233 Given a sample curriculum, identify and explain the major steps in curriculum planning as devised by Ralph Tyler.

0234 Given a list of social studies objectives, identify and explain levels of each objective according to Tyler.

0235 Given a list of learning opportunities, arrange them in reference to sequence, continuity and integration in curriculum theory.

0236 Explain the role and characteristics of learning opportunities in curriculum development.

0237 Given an objective, the student will explain at least two models that could be used in evaluation of that objective.

0238 The student will describe at what times it is most appropriate to use programmed instruction in the social studies.

0239 The student will list five principles of programmed instruction as enumerated by Educational Testing Service.

0240 The student will outline and offer a rationale for a curriculum elementary social studies (grades K-6).

0241 Given a sample curriculum, the student will identify and define the six processes in curricula building according to "Basic Principles" by Ralph Tyler.

0242 Given a series of social studies curricula, and a background information sheet of an imaginary elementary school, evaluate the material as its usefulness to the imaginary school.

Value Component

Minimum

0301 After examining a list of 50 value statements, when the student feels ready, he will take a multiple choice test concerned with recognizing value statements and interpreting value statements - 70% or better proficiency.

0302 Given the same list as in 0301, and a multiple choice test, the student will recognize historical events related to values - with 70% proficiency.

0303 Given the list of 50 value statements, to identify in a multiple choice format a social science premise on which it was based - 70% proficiency.

0304 Given 15 value statements from the list of 50, to provide in five sentences or less a contemporary example involving the value orientation.

0305 Given a list of typical institutions and power groups (e.g. American Legion, NAACP,) explain by essay what power a group holds. The group will be selected by an evaluator.

0306 Given the same group as in 0305, describe what values it holds.

0307 Given the group chosen in 0305, compare the groups values with those of American Education today.

0308 Given a background information sheet on a class, select values to be taught and describe a procedure for teaching those values.

0309 Given an assignment of observing elementary school students on their way home from school, later record field notes about what groupings were observed.

0310 Given a scrambled checklist of the characteristics of a "conservative" and "liberal" analyst in Stanley Hoffmann's Daedalus 1962 article, sort out of the list the set of "conservative" & "liberal" characteristics.

0311 Given an article by "liberal" political analyst, identify his ideal of political order & man's proper role in that order.

0312 Given an article by contemporary "conservative" analyst of political affairs, identify his ideal of political order and man's proper role in that order.

0313 Given both "liberal" & "conservative" analyst's articles, compare their assumptions and ideal about man and political order, on multiple choice test - 80% proficiency.

0314 Given a case study of racial disturbance on a college campus, analyze value statements made by black leaders and white administrators.

0315 List and explain five classroom strategies for value clarification.

0316 Teach a 10 minute lesson employing two value clarification strategies.

Specialist

0317 Given five conversations or lessons presented in video tape, the student will identify the value orientations of the participants.

0318 Given a list of social science premises, historical events and contemporary issues, the student will identify a major value assumption or conflict associated with each.

0319 Given a background information sheet on a school, select and organize a program of value teaching.

0320 Given a videotape of conflict between a taxpayers' protest group and a legislative subcommittee in a hearing, support the arguments of one group over the other in written form, demonstrating understanding and ability to extend argument.

0321 Given field notes (from 0803-18) and a checklist of a typology of elementary school students, match different groups to different values, to satisfaction of evaluator on the basis of the "match" of types and field notes.

Sensitivity - Improvisation Component

Minimum

Concept Cluster

0401 Given a list of words and phrases, identify generalizations and identify concepts within that list.

0402 Given a unit topic in elementary social studies curricula, the intern will be able to suggest six concepts, six facts, and six generalizations that would be appropriate for the topic.

0403 The student will list and explain seven steps in the teaching of time.

0404 Given a political cartoon from a text or newspaper, the student will teach a short video taped lesson concerning how to interpret the pictorial representation.

0405 The teacher will list and explain two steps in the teaching of geographic concepts.

0406 When given lesson plans indicating social and economic level, and teacher objectives, the student will be able to judge the teacher's likelihood of reaching the objective with the majority of the class.

0407 Given a map from a standard elementary text, the student will teach a video taped, short lesson concerning how to interpret the pictorial representation.

Methods of Instruction Cluster

0408 When shown on video-tape segments of five different lessons, in which the instructor is attempting to provide a creative experience, and his instructional activities are inappropriate, the intern will write three appropriate instructional strategies that would encourage divergent thinking.

0409 When shown a video tape of 5 classes, each showing a fifteen minute segment of a social studies lesson, the intern will be able to identify those classes in which the 1) inquiry approach 2) socratic 3) role play is being demonstrated.

0410 List nine criteria for selection and four procedures for the teaching of current affairs.

0411 The student teacher will subscribe to and read *Time* magazine or any other weekly news magazine, and will demonstrate either on paper or verbally the ability to relate current events to a social studies unit.

0412 Given a social studies unit, the student teacher will suggest in writing 5 ideas for creative writing lessons and will demonstrate one of them.

0413 Given a unit, the student teacher will demonstrate instances in which various A-V equipment would be appropriate in supporting his/her unit.

0414 Given a unit, the student teacher, in a microteaching situation, will conduct a "guided reading" session in which she encourages divergent and creative thinking.

0415 Given a social studies unit, the student teacher will show how Dr. Durrell's echo approach can be effectively utilized in her unit.

0416 Given a social studies unit, the student teacher will draw up 3-5 potential research projects appropriate to the grade level, interest level, and social studies unit.

0417 Given a social studies unit, the student teacher will initiate (set up rules for) committee work and will organize (on paper) topics and means of presentation.

0418 The student teacher will suggest on paper the potential role of the following reference materials to her unit: encyclopedia, dictionary, magazines, history books, letter-writing for information, appropriate TV shows, biographies, maps...

0419 Given a unit the student teacher will program this unit for independent study, including in it at least four out of six of the following activities: 1) independent reading 2) art activities 3) research 4) creative writing 5) history and 6) letter writing; and will devise a method for either group or independent evaluation.

Student Oriented Cluster

0420 Given a social studies unit topic, the intern will explain twelve ways in which the teacher might have used students as communicators of ideas.

0421 When shown a description of a heterogeneous class, and the objectives for a social studies unit topic, the intern will describe learning activities that might compensate for differences in experience of individual children.

0422 The student will create three objectives and explain appropriate learning opportunities concerned with community utilization.

0423 Given a specific ethnic group, the student will outline a unit demonstrating an understanding of this ethnic group.

0424 Given the same ethnic group, the student will outline a unit using the ethos of the group.

0425 Shown a series of two video tape segments which establish a classroom situation of some difficulty, the student will role play his response.

0426 After a discussion of discipline (hitting, shoving...) and classroom control and direction (wetting pants, throw ups...), the student teacher will respond appropriately to 4-5 classroom problems while demonstrating a lesson.

0427 After a discussion of creative testing, the student teacher will devise one test applicable to a unit, including in it the following activities: art, creative writing, evidence of divergent thinking.

0428 Given the same unit as in 0428, the student teacher will plan five learning activities which are appropriate to slower, average and superior learners at this particular grade level and for this particular social studies unit.

Coordinated Disciplines Cluster

0429 Given the same social studies unit as in 0428, the student teacher will suggest three small group role play situations and one large group situation.

0430 Given the same social studies unit as in 0428, the student teacher will derive 3-5 science lessons appropriate to the grade level and social studies unit.

0431 Given the same unit as in 0428, the student teacher will select 10-15 words related to the social studies unit to be used for the weekly spelling lesson.

Art and Music Cluster

0432 Given a unit at the preferred grade level, the student teacher will suggest five art activities (e.g. model city, shadow boxes, paper mache globes...) relevant to the grade level and social studies unit, and will explain on paper how each activity supports his unit.

0433 After a demonstration session on used and construction of bulletin boards, the student teacher will design two 3-D working, teaching bulletin boards appropriate to the same unit as in 0428.

0434 Given the same social studies unit as in 0428, the student teacher will find three songs appropriate to the grade level, interest level, and social studies unit; the student teacher will demonstrate one of them.

0435 Given the same unit as in 0428, the student teacher will select records appropriate to the grade level and relevant to the social studies unit (if applicable).

0436 Given the same unit as in 0428, the student teacher will suggest 1-2 dances (e.g. folk, native, square...) appropriate to the unit (if applicable).

Specialist

Student Oriented Cluster

0437 Shown two short documentations describing a type of American Community. The student will answer a True-False test concerned with the accuracy of the factual statements about the films.

0438 Five social studies topics and three communities will be used in developing fifteen outlines. Two of the three communities used will be taken from the films. Given these 15 outlines, the student will select two outlines appropriate for students from each of the two communities described in the film.

0439 Shown a series of 25 video tape segments which establish a difficult classroom situation, the student will role play his response.

APPENDIX B

SOCIAL STUDIES LAB 800-1200 STUDENTS

ITEM	QTY	DESCRIPTION	UNIT	TOTAL
		16 TEACHING STATIONS - 30 PER STATION		
1	16	Overhead Projectors: Bell & Howell 301A	175.00	2,800.00
2	16	Record Players: 300T	80.00	1,280.00
3	16	Tape Recorders: Wollensak 2520	169.00	2,704.00
4	8	Loop Projectors: 810Z	160.00	1,280.00
5	4	Automatic 16MM Projectors: 552T	635.00	2,540.00
6	16	Screens: Radiant 60 x 60 w/KEW Brackets (Adjustable)	38.00	608.00
7	2	Opaque Projectors: Beseler VuLyte III	396.00	792.00
8	2	Portable Tripod Screens: Radiant 50 x 50	60.00	120.00
9	8	2 x 2 Slide Projectors: Kodak 850QZ	199.00	1,592.00
10	16	Filmstrip Projectors: Bell & Howell (Automatic) 745C	159.00	2,544.00
11	16	Overhead Projection Tables: Radiant	49.00	784.00
12	8	22 Inch Educational Television: Admiral Model E2216T	250.00	2,000.00
13	4	Sound Filmstrip Projector: DuKane Model 14A650A	225.00	900.00
14	2	Tape Cassette Sound Filmstrips: DuKane Model 28A15	255.00	510.00

SOCIAL STUDIES LAB 800-1200 STUDENTS Continued

ITEM	QTY	DESCRIPTION	UNIT	TOTAL
15	16	Filmstrip Viewers: Standard Model 201	37.00	592.00
16		Graphic Arts Materials and Equipment		14,530.00
			TOTAL----------------------	$35,576.00

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	1 series	Events and People 9 Loops - Ealing 893537	218.55	218.55
2	1 series	The World Around Us 8 Loops - Ealing 893545	199.60	199.60
3	1 series	Colonial American The Pilgrims at Plymouth 8 Loops 89-3065	224.55	224.55
4	1 series	How Man Lives 9 Loops Set 893008	224.55	224.55
5	1 series	Australian Aboriginis 893032 4 Loop Set	99.80	99.80
6	1 series	Indians of the Orimoca Jungle 8 Loop Set 893040	199.60	199.60
7	1 series	Africans of the River Niger 6 Loops 893057	149.70	149.70
8	1 series	History - Documents Project - Thorne 54 Loops	899.10	899.10
9	1 series	Elementary Social Studies - L.C.F. 10 Loops	174.00	174.00
10	1 series	South Asia - I.C.F. 23 Loops	402.00	402.00
11	1 series	Japan Series - I.C.F. 7 Loops	126.00	126.00
12	1 series	North Africa - I.C.F. 3 Loops	58.50	58.50
13	1 series	Middle America - I.C.F. 16 Loops	278.00	278.00
14	1 series	South America - I.C.F. 6 Loops	110.00	110.00
15	1 series	Eastern Europe - I.C.F. 16 Loops	282.00	282.00

Continued

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
16	1 series	Sub-Sahara Africa - 14 Loops	246.00	246.00

TOTAL--------------------$3,891.95

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	1 series	8 - Teaching Mobil Graphs - Industrial	13.95	106.00
2	1 series	5 - Teaching Mobil Graphs - Land Farming	13.95	66.25
3	1 series	10- Teaching Mobil Graphs - Home & Community	13.95	132.50
4	1 series	57- World History & Culture - Creative	6.00	300.00
5	1 series	60- American History - Creative	6.50	300.00
6	1 series	36- Topical Series on American History - Creative	6.50	180.00
7	1 series	400-American History Cartoons 8 Sections - Creative	6.50	680.00
8	1 series	22- Communism - Creative	6.50	113.00
9	1 series	18- Understanding Maps - Creative	6.50	90.00
10	1 series	10- Exploration, Territory Growth & Geography of U.S. - C.A.F.		48.00
11	1 series	8 - Constitutional Amendments - C.A.F.		43.00
12	1 series	13- President Administration and Political Parties C.A.F.		50.00
13	1 series	7 - Geography and Population -- C.A.F.		38.00
14	1 series	9 - Our Modern Economy - C.A.F.		46.00
15	1 series	7 - The Changing World - C.A.F.		34.00

Continued

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
16	1 series	37- World Geography 2 sections - C.A.F.		164.00
17	1 series	165-Outline Maps - C.A.F.	1.75	272.50
18	1 series	K & E Master Books No. of Maters		
		US History 487	80.00	
		World Cultures - Africa 212	43.00	
		World Cultures - Canada 230	50.00	173.00
19	1 series	88- U.S. History K & E		400.00
20	1 series	14- Basic Principles of Government W 37 OL Tecnifax		45.00
21	1 series	11- Government W 28 OL - Tecnifax		53.95
22	1 series	Western Civilization Volume 1,2 & 3	39.50	109.50
23	1 series	40-History and Geography of U.S. - V.M.I.		168.00
24	1 series	41-Civics and Government of U.S. - V.M.I.		168.00
25	1 series	Growth of Constitutional Rights - V.M.I.		61.50
26	1 series	North America - Indian		54.00
27	1 series	Federal Government		66.50
28	1 series	Discovering and Exploring of United States		70.00
29	1 series	Map Kit of Asia, Australia and South Pacific		47.00

Continued

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
30	1 series	Map Kit of Africa and Middle East		47.00
31	1 series	Map Kit of Latin America		47.00
32	1 series	World in Scope 44 Transparencies		452.00
		TOTAL-------------------		$4,619.70

SOCIAL STUDIES - AUDITORIUM

ITEM	QTY	DESCRIPTION	UNIT	TOTAL
1	3	12 x 12 Electrical Screens	625.00	1,875.00
2	3	566 Bell & Howell	1,600.00	4,800.00
			TOTAL----------------------	$6,675.00

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	1 series	Profiles in Dedication - Imperial Tapes	4.25	96.45
2	1 series	Famous Monuments in History Come to Life - Imperial	4.25	96.45
3	1 series	The Full Story of the Constitution - Imperial	4.25	16.25
4	1 series	The Living History Book (20) - Imperial	7.25	139.00
5	1 series	The Full Story of the Civil War - Imperial	4.25	16.25
6	1 series	Block Heritage - Imperial	7.25	189.00
7	1 series	Multi Media Southern Africa		250.00
8	1 series	Multi Media Mexico		54.00
9	1 series	Multi Media Japan		54.00
10	1 series	Wollensack Teaching Tapes (26)	7.95	206.70

TOTAL-------------------$1,101.60

GRAND TOTAL-------------------$51,864.25

LANGUAGE ARTS

Introduction

Goals. Communication is the prime focus of the Reading and Language Arts area. The function of a teacher in this content field is to develop or improve the students' ability to communicate. This ability must include the communication of self and of emotion - areas in the repertoire of language as communication which up to now have been ignored in education. The Language Arts include listening, speaking, reading and writing. We believe that is is necessary that an individual be able to freely communicate information, ideas, attitudes and emotions effectively, commensurate with today's and tomorrow's needs and developments. It is important, therefore, that techniques of communication, such as non- verbal cues, use of new technological developments and simultaneous use of multiple media be incorporated into curricula for the education of children and of future teachers. This is not to dispute the effectiveness of books and other printed materials for use in reading; records, tapes, and traditional classroom verbal activities for speaking and listening; and typewriters, pencils, pens and paper in writing. Traditional successful media need not be ignored or discarded, but their use must be maintained only when they are the most relevant and applicable materials.

Our goals in terms of teacher characteristics emphasize an openness to all approaches, new and old, and a constantly expanding repertoire for presenting concepts and materials in the Language Arts (with, of course, the assumption that this openness and expansion will carry over to the other curricular areas, and to the teacher's entire performance). With the willingness to try new and different approaches, in other words, the willingness to take risks, we are hoping to develop and encourage the understanding that there is no one right way of doing anything, but rather that there are a number of viable alternative routes; an awareness of one's own learning style, and the concomitant awareness that one learning style is not superior to another. We would further encourage an awareness in the candidates of their own variety of learning preferences in terms of materials and approaches. Some students, for example, vastly prefer reading on their own to attending a lecture; others prefer the lecture; some enjoy and profit from a combination of the two; still others prefer some audio or visual media. The assortment and combinations are limitless. Nevertheless, some students come to us unaware that they have a particular learning preference, or are unaware that others do not share their particular preference. Our goals are to have the students use their awareness of the different learning preferences in their own teaching by learning to provide a variety of learning experiences for their students.

Our goals for this program include what we believe teachers should be able to do as well as what we believe they should be. We have, therefore, provided performance criteria which include demonstrating proficiency and knowledge in the specific content of the language arts. Certainly a knowledge of, and ability to use many approaches in the teaching of reading, or any of the areas within the Language Arts, is of outstanding importance. The ability to plan activities with a specific population in mind, rather than having some notion that a particular lesson can be good in the abstract or out of context is another ability we propose to develop in our students. These and other abilities are derived directly from a hierarchy of teaching abilities which we have postulated. This hierarchy specifically delineates our goals. We have formulated our performance criteria for the operational study based on the four elements in the hierarchy.

The Language Arts feasibility study samples the essential phases of the eventual operational program. Our intention when the program is operational is to develop in our teaching candidates the following hierarchy of abilities:

1. proficiency in the language arts content (i.e., the ability to communicate effectively, both verbally and non-verbally).

2. knowledge of the processes of each of the language arts areas (such as the physiological, emotional, intellectual and social aspects of speech development). In other words, the candidate must be able to analyze what acts are necessary for effective communication, whether or not the process depends on a sequence of skills or any special combination of skills, and what the specific skills of listening, speaking, reading, and writing entail. We will at the same time expect the candidate to understand the developmental and learning processes involved in the acquisition of content knowledge.

3. ability to assess the child's level of development and to diagnose his skill needs, using both formal and informal devices. The candidate must recognize strengths as well as weaknesses, and must help the child to do the same. Further, the candidate must be aware that the diagnostic process is a continuous one.

4a. knowledge of a variety of approaches and materials available in each area of the language arts (i.e., the linguistic, phonic, eclectic, experience, individualized, programmed, and i.t.a. materials for teaching reading).

4b. ability to select from the many available materials and approaches, or to generate new approaches and materials to satisfy the needs of the children based on the individual child's diagnosed strengths, weakensses, developmental stage, and observed learning patterns. Part of the ability to select an approach is the ability to help a child acquire a given skill by dividing the skill into a number of levels ranging from the simple to the complex, the familiar to the unfamiliar, and the concrete to the abstract. The teacher must also be able to interrelate the skills as well as the areas of communication and to integrate them into the child's domain.

We have presented these abilities in hierarchical order. These constitute a taxonomy of teaching abilities. We assume that, in order to be able to select an effective approach, (4b) the candidate must be able to draw from any known approaches (4a) after having assessed the student's abilities and needs (3) based on the candidate's knowledge of the process (2) which in turn comes at least partly from his ability to perform the act (1).

Table I on the following page illustrates the distribution of performance criteria (PC) in our feasibility study. A brief key to what the performance criteria contain follows below: a full description and rationale appear later in the report.

PC 1. comparing and evaluating 3 readers
2. discussing basals (in small groups)
3. administering Informal Reading Inventory
4. Dividing a class into reading groups
5. developing a quiz to test comprehension
6. devising 3 techniques for analyzing words
7. taking a phonics test
8. reviewing a linguistic reader
9. writing and evaluating i.t.a.
10. devising 5 different materials for the language experience approach to teaching reading
11. conducting an initial "interests survey" interview with a child
12. demonstrating the use of 3 reading machines and/or kits
13. devising one week's activities in language arts for a special population
14. selecting a personal professional library, given a hypothetical $100.00
15. selecting 3 methods of evaluating a reading objective
16. observing, taking and discussing the administration of I.Q. tests
17. selecting a class library
18. reading a portion of a story aloud
19. describing 3 ways of presenting a story

TABLE I

HIERARCHICAL DISTRIBUTION OF THE PERFORMANCE CRITERIA

	Levels of Hierarchy				
PC #	Level 1	Level 2	Level 3	Level 4a	Level 4b
1		X		X	X
2		X		X	X
3			X		X
4			X		
5		X	X		
6		X		X	
7	X				
8		X		X	
9	X	X		X	X
10		X			X
11		X	X		
12	X	X		X	
13					
14				X	
15			X	X	X
16		X	X		
17					
18	X				
19					X
20					X
21					
22	X				X
23					X
24					X
25					X
26				X	
27		X			
28		X			

Key:

Level 1 = Proficiency
Level 2 = Knowledge of Process
Level 3 = Ability to Diagnose
Level 4a = Knowledge of different materials and approaches
Level 4b = Ability to select an appropriate approach

20. describing 3 activities for motivating creative writing
21. outlining a formal and informal method of teaching spelling
22. demonstrating writing on a chalkboard in manuscript and cursive forms
23. devising 3 dramatic activities for a specific class
24. describing 3 ways for achieving a speech objective
25. describing 3 ways for achieving a listening objective
26. constructing an annotated bibliography on one topic
27. writing a paper on readiness
28. writing a paper on the different approaches to word analysis

Outcome of the Feasibility Study. The findings in this report are based on a tentative summary of the data. A comprehensive data analysis is now being processed. This report contains descriptions of the instruments we used, and the kinds of data we received. It also contains suggestions for revisions based on the information we have thus far examined.

We can, however, with some assurance, report at this time that the study demonstrated both the managerial and pedagogic feasibility of the METEP Language Arts component.

Design and Implementation of Pedagogical Feasibility Study

Description of study design. Population. In September, 1969, the Language Arts staff abandoned its original plan to operate two separate Language Arts programs, the traditional methods sections and the METEP program, in favor of including all 120 elementary block students in the METEP program. This decision about population had some important implications for the evaluation design:

a. increasing the number of students provided much more information about abilities (especially the range of abilities), performance during the program, and reaction to the program.

b. dropping the idea of holding separate methods class sections meant losing the obvious control group, but since members of the Language Arts control group might well have been in the Math, Social Studies or Science treatment groups, it would have been fruitless to claim independence of groups anyway. (In fact, there is a very promising control group in the Elementary Intern Program which we plan to use spring semester for a study of the relationship between learning procedures and teaching procedures).

c. increasing the number of students meant that staff time also had to be increased. Since only two Language Arts faculty were available during the fall semester and since METEP was designed as a program for specialists as well as generalists, part of the fall program was devoted to the recruitment and training of 15 potential Language Arts specialists who served in staff positions. These students ranged from sophomores to doctoral students (perhaps a more dramatic range is from 5' to 6'8"). The data collected on their training is at least as interesting and probably as important to the future of METEP as the information on the 120 generalists. The feasibility study included only one specialist's PC (rating two or more generalists' PC's). The specialist program, of course, would include many more PC's not incorporated in the feasibility study.

d. with 120 students passing 28 PCs in 5 weeks the School of Education facilities were used heavily. Since data was collected on each PC and IA taken by each student, we now know a great deal about usage patterns.

e. communicating with the 120 generalists (the elementary block students) and the 15 raters would be difficult under the best of circumstances. It was done in this program with one 2 hour group meeting for the generalists and one equally lengthy session for the raters. Again the sheer number of students meant not only more careful attention to details, but also different kinds of activities than would have been necessary with a smaller group.

f. getting information such as a complete and accurate class roll, addresses and phone numbers was difficult.

Data Sources.

a. Ability measures on the 120 students. On October 29, two days before the end of the program, a battery of 5 tests were given during a one-half hour period. All of these tests were designed to be highly stable measures and theoretically could have been given at any time during the five weeks. Three of the five tests were taken from the Kit of Reference Tests for Cognitive Factors, French, Ekstrom and Price ETS, 1963. This kit is designed for research workers interested in identifying 24 specific aptitude or achievement factors. The other two tests, lisening and reading, were developed during the program when no suitable listening test could be found in the French kit. An appropriate reading test, First and Last Names, was available, but it was felt that the listening and reading tests should be comparable so both were developed from one source. We are indebted to David Berliner, University of Massachusetts, School of Education, for the design of these 2 tests.

(1) Surface Development Test (French, et al). According to the manual, this test measures "The ability to manipulate or transform the image of spatial patterns into other visual arrangements." Research by David Coffing, University of Massachusetts, School of Education, has suggested that people adept at visualization as measured by this test will have greater success learning from visual material (such as a TV tape) than those who have difficulty envisioning 2 dimensional objects transformed into a 3 dimensional world. Since the Language Arts program included TV tapes, films and filmstrips as instructional alternatives, we were interested in discovering the range of ability which we might find in the students and in seeing of those scoring high in this ability: 1. professed an interest in audio-visual learning, and 2. actually took the AV instructional alternative when it was offered (or conversely, if those who scored low on this test

avoided using the audio-visual approach).

(2) Listening Test. Students were told they were about to hear about surfing in Hawaii. When the reading was through, they were to write down as many main ideas as they could remember. A paragraph from an article on "Polynesian Surfing" (Natural History, Vol. LXXVIII, #7, 1969) was read. A list of 27 possible ideas was compiled and one grader counted the number of ideas listed by each student. Since Language Arts offered lectures as one Instructional Alternative for each PC, we were again probing the correlation between listening scores and both professed interest in lectures and actual lecture attendance, as well as some gross measure of the range of abilities within the group.

(3) Apparatus Test (French, et al). A test of sensitivity to problems, it measures "the ability to recognize practical problems." Scores are computed as D, number of drastic suggestions, and M, number of minor suggestions made. Since the students were constantly being asked for help with the design of future METEP programs (each student filled in a 3 page questionnaire for each of the 28 PC's, plus a 10 page questionnaire on the final day), we were very interested in their ability to make helpful suggestions on the questionnaire. Information about helpful and unhelpful parts of the IA was coded as: 0 equals no answer, 2 equals too vague to be of help, and 1 equals specific. Suggestions for changes in the IA's and PC's were rated as: 0 equals no answer, 1 equals minor suggestions (qualitative) and 2 equals major (qualitative) suggestions. High correlation between minor scores on the Apparatus Test and questionnaires might suggest that the level of suggestion-making is more related to the student's native "ability to recognize problems" than to any intrinsic value or shortcomings of the METEP program.

(4) Reading Test. A second paragraph from the article on Polynesian surfing was read by the group (a two minute time allotment meant that even the slow readers had sufficient time to finish the paragraph). Again, the students were asked to list main ideas; a list of 34 possible ideas was compiled and one grader scored the tests. Since Language Arts often offered library reading (or browsing without specified reading list) as an Instructional Alternative, interest was centered on the correlation between scores and both library IA's used and professed interest in library learning, as well as the over-all range of abilities.

(5) Alternate Uses (French, et al). A test of "Semantic Spontaneous Flexibility", it measures "the ability to produce a diversity

of verbally expressed ideas in a situation that is relatively unrestricted. The METEP Language Arts program puts a high value on flexibility. The choice of instructional alternatives in itself suggests this commitment; many of the PC's state "Suggest three alternate ways ...you will be judged by the appropriateness and diversity of your methods." Here the correlation between satisfaction with the program (judged by positive comments on the final questionnaire and actual performance during the program) and score on the flexibility test, was of interest. A high correlation here would be especially valuable, since the test could then be used as a counseling instrument for students entering the program.

b. Attitude Change. At the beginning (September 23) and end (October 31) of the program, two 36 items semantic differentials were given using 2 concepts: Learning and Discipline. The 36 items used were developed by Steve Rollin, University of Massachusetts, School of Education. Semantic differentials are designed to test attitude towards a specific concept (idea, activity, name). All items can be regarded on a positive to negative scale or items can be clustered as measures of value, potency and activity. A number of scores are available: pre-test distances between the concepts (both on the one scale and on the 3 factors), post-test distances, changes in the distances, change in attitude toward Learning, and change toward Discipline. All this information is available for both the individual and the group.

Learning and Discipline were chosen because the METEP Language Arts program places strong emphasis on the individuality and diversity of learning types, and relies heavily on the self-discipline of the students. In fact, the program tells the students: "Here are 28 things you must be able to do by the end of 5 weeks, and there are at least two ways to prepare yourself to accomplish each of them. Those ways include lectures (schedule gives date when PC will be covered), readings (packets in the library), audio-visual materials (tapes, records, etc. on specific PC's available in office), classroom observation corridor in the Mark's Meadow laboratory school, and self-practice (materials and elementary students available). All your work will be rated and returned to you within 4 days of the time you pass it in. The office is open 9-5 every day, come to see us if you have any problems."

In addition to looking at attitude change directly, the semantic differential scores can be compared to the flexibility and

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satisfaction scores mentioned earlier (ability measure #5). The same scores might also provide interesting interaction with suggestion-making ability scores (see ability measure #3). Two types of changes will be made in the semantic differential next semester. There will probably be a decrease in items, based on the item analysis results from this semester, and there will be an increase in the number of concepts, particularly the risk-taking concepts being developed at the University of Chicago by Phillip Moy and E. Brewster Smith.

c. PC and IA Questionnaires. Each time a student completed a PC he submitted a three page questionnaire. This volume of material (120 students times 28 PC's) was coded by some of the METEP raters according to a coding sheet. The questionnaires yielded the following information:

student's name and PC number
time taken to complete PC
student's judgment of the value of the PC to himself
  as a student; as a future teacher
suggestions for a better PC rated as major or minor,
  (suggestions compiled separately)
IA taken (how many, which ones)
length of time for each IA
suggestions for improving IA (rated as major, minor,
  suggestions compiled separetely)
judgment of value of IA as preparation for PC, or as
  expressive objective
whether the student passed or failed the PC.

Obvious data available from these questionnaires include the use of facilities (library, machines, etc), the number of students taking various instructional routes (for example, many fewer used audio-visual materials or observation than we had anticipated), some specific data on those students who failed the PC on the first try (instructional alternative taken, expressed satisfaction with the PC - both its "value" and the suggested improvements, even the amount of time taken on IA and PC).

d. Final Questionnaire. Much of the data on the final questionnaire duplicates data on the PC and IA questionnaire mentioned above. The final questionnaire was administered on the last day of the program (October 31), and besides having the advantage of being pre-coded, it gave the students an opportunity to look back over the program rather than judge the individual PC and IA before they knew how they had performed. Additional information from the questionnaire included:

1. background data on each student:
   age, six, academic status, previous experience with children, own school experiences
2. judgments about total program (where to make changes):
   a. total program evaluation
   b. quantitative changes (number of PC's, or amount of work per PC)
   c. PC emphasis (especially by making areas optional)
   d. IA improvements
   e. changes in rating system or office routine
   f. importance of METEP in future teaching success
   g. understanding and agreement with basic goals of program.
3. some interesting cross checks of professed attitudes:
   a. own school experience-preference for first teaching position - ranking of elementary experience as value in teacher preparation.
   b. professed attitudes about IA type - IA revisions suggested.
   c. attitudes - suggestions on final questionnaire - the students' 28 PC and IA questionnaires.

e. Rater's List. Each rater (Language Arts faculty and raters) chose one or two PC's for which he would be responsible. He graded (pass/fail) all 120 students; he returned the PC's to the student; he kept a master list up to date in the office which recorded for each student: the date each PC was passed, and he kept a rater's list which recorded the date it was returned, and whether the PC was rated pass or fail. These rater lists provide some interesting data on the arrival times of completed PC's and on the grading time both by PC (or by rater) and by week. Data also includes the "fail" rate by PC, by week and by student. (Failure theoretically carried no stigma.) The student was told he must pass the PC and could try as often as he wished. The students apparently accepted this much more readily than the raters. Interviews with the raters at the end of the program revealed that fails were not recorded as rigorously as passes (i.e., "fails" were returned to students without being recorded on the list at all, and only later, when the student passed was a notation made.) The raters involved were requested to restore their "fail" data as best they could before the lists were processed, but for next semester's program we will have to revise our terminology.

f. Raters' Final Reports. Each rater was asked to write up the following information about each PC which he rated:

1. description of the PC.
2. criteria for rating (criteria had been developed at the beginning of the program, but these sometimes changed as new problems developed with the PC's)

3. suggestions for improving the PC.
4. description of each IA.
5. suggestions for improving each IA.
6. comment on the value of rating this PC as an academic experience for you, and making any suggestions for improving rating as an academic experience for a language arts specialist.

In addition to providing some very helpful information to the staff on curriculum changes, the range of suggestions and even the depth of understanding of the purpose of the PC was of great interest. As with the generalists, there may be a correlation between performance in the program (for raters the grading time lag could measure this) and type (minor or major) of suggestions offered, in short, some sort of "commitment index". At this time, the two relevant ability tests (sensitivity to problems and flexibility) have not been given to the raters, but they will be given within the next few weeks.

g. Miscellaneous Sources. As with all programs, Language Arts, METEP learned a lot about itself from other people. The School of Education librarians watched our students working, and idle passers-by watched in facinated horror as students, raters and staff went about the business of passing in, grading, returning and discussing 28 PC's 120 times. Still to be collected is information from the students' supervisors and master teachers, and of course, from the students themselves after they have practice taught. Information from these sources will be categorized as:

1. competency (can they do what we thought they could do)
2. satisfaction (change in valuation of program after school experience)
3. teaching style (ability to use flexible approach in teaching).

Description of study as performed.

It should be noted that the Language Arts Task Force was in operation from March '68 - January '69. March - December '68 comprised the planning phase.

Spring and Summer 1969: 2 staff and 1 research assistant planned the program, and 4 graduate students on independent study developed the IA's.

Approximately 70 PC's were developed for generalists and specialists.

28 PC's were selected for feasibility study.

IA's were developed (forms, lists, selections written, criteria for evaluation).

Evaluation planned.

Early September: All PC and IA information duplicated for students.

PC and IA information plus rating criteria and procedures duplicated for raters.

September 22: One hour information meeting for raters. Raters materials handed out.

September 23: Two hour information meeting for students. Student packets handed out. First semantic differentials administered.

September 29 - October 29: Program in operation.

October 29: Time taken from group activity for PC 16 to give half-hour test battery.

October 31: Final questionnaire and second semantic differentials filled out during group meeting.

November 4: Raters final reports due. Meeting with raters for suggestions for next semester's program.

November 12: Coded questionnaires due from raters. Last information to go to key punch operators.

November 15: Final report due.

Description of PC's and IA's Tested

Our performance criteria were selected to cover the essential areas within the Language Arts. Reading, and the different approaches to teaching reading, was our prime focus in the feasibility study, but all areas of creativity within the Language Arts were stressed. We omitted any PC's on structure of the language because structure is most effectively learned when it is incorporated into creative writing, spelling, and oral communication. For our operational program, we will include PC's on structure across all 4 levels of the hierarchy; that is, we will expect our students to familiarize themselves with the terminology of transformational grammar as well as traditional grammar, and we will encourage their exploration of children's texts in a structural linguistic series published by other more traditionally oriented publishers. We also expect the candidates to incorporate grammatical principles into their lessons in the other areas of the Language Arts.

The Instructional Alternatives (IA's) included a variety of learning activities. At first, it was our intention to provide lectures for most, but not all the PC's. It became clear to us through direct feedback from the students that we should provide lectures for each PC. Indeed, students often attended lectures in addition to working one or more other IA's. Students were also given the option at any time of attempting a PC without any IA's. Many students took advantage of this option. Some used it as a pre-testing experience, to give them a clear idea of what the PC entailed; others were very successful in their first attempts. Students varied considerably in their level of previous experience with children, and with the specific subject matter. They also varied considerably in their risk-taking abilities. These factors were very influential in their decisions as to which IA's, if any, they would try. Each candidate also was given the opportunity to devise a new instructional alternative of his or her own choice. No student was prohibited from attempting any IA not delineated or offered by us, if he considered it potentially valuable. We did not include "talking to other people" as an instructional alternative, but we should have, and will do so next time. In fact, candidates did talk to each other, the raters, the instructional staff, cooperating teachers, children, and anyone they could reach at any time. They profited greatly from these verbal encounters. Other IA's included audio-tapes of the lectures, video tapes specially prepared by Masha Rudman for this study, other video tapes, a film, a film-strip and record combination, and readings compiled by graduate students who pursued Independent Study with David Yarington last summer. All of the IA's will be specifically described in this section. Revisions are in progress at present, and will be a continuing procedure. More TV tapes are being developed in hopes that our equipment and scheduling problems in this area will be eliminated by next semester.

We selected twenty-eight performance criteria from a list of about seventy which we had developed for the possible operational study. Our original list included PC's for both generalists and specialists. For the feasibility study we decided to include only generalist criteria, with one or two specialist PC's for raters who plan to be specialists in the Language Arts. We believe that the PC's that we have selected represent the total program.

Our PC's, as previously mentioned, cover all the levels of the hierarchy. Students could elect to attempt any PC in any order, although we arranged the listing of PC's for the students in clusters according to content: the different approaches to Reading were presented first (PC's 1-12), with the basal eclectic materials first (PC's 1-4), because of their wide use in this country. We then offered some PC's dealing with the reading skills, particularly those of comprehension and word analysis (PC's 5-7). The next six PC's considered other reading approaches in varying degrees of depth (PC's 8-12). Specific comments and suggestions for revision of these are included later in this section. PC's 13-21 asked that the candidates devise different kinds of activities for the various Language Arts, depending on the population the candidate had selected. Included here, too, are PC's guiding the candidate to areas and sources where information on varieties of materials and approaches can be found. Specific categories within the content area include story-telling, creative writing, and spelling. We inserted proficiency in handwriting (PC 22) before resuming our requests for alternative approaches. PC's 23,24 and 25 again stress this level in drama, speech, and listening. PC 26 seeks to lead the candidate to explore the information available on any specific topic of interest in this content area. PC's 27 and 28 concentrate on the process of beginning reading, stressing readiness and approaches to word attack. Criteria for evaluating each of the PCs were developed for the raters' use. These as well as the PC's and IA's will be revised as needed as an ongoing process in METEP.

The following is a description and rationale of each of the performance criteria and instructional alternatives used in our feasibility study, with some suggestions and guidelines for revision.

PC 1: Candidates were given evaluation forms as suggested guides to their examination of the teachers' manuals for three elementary Readers. Each Reader represented a different publishing house. The three main areas of investigation were Publishers' stated purpose, the approach used, and an evaluation of the content. These areas formed the framework within which more specific questions were raised. Candidates were asked to evaluate and compare the three texts they had selected. No additional restrictions were placed on the choice of text, except that the texts be on the same grade level.

Rationale: (Please refer to the hierarchical distribution chart for a graphic presentation of each rationale). Examining and evaluating different publishers' texts serves a dual purpose: students become aware of the process by which certain materials are designed to teach reading. The skills and approaches delineated in these manuals differ, one from the other, and include a wide range of opinions on the intrinsic nature of the reading process. The differences and varieties should also communicate to the candidate that there is no one right approach; each publisher is so convinced of the 'rightness" of his particular sequence, methodology and materials, that it becomes obvious that none of them has the sole answer. This PC also serves to help acquaint the student with the materials available to the schools in the area of published reading programs. It is our intent that the candidate use this PC to learn to examine materials in the light of his own needs for teaching.

Suggestions: On the whole, this PC accomplished its purpose. We hope to clarify the wording on evaluation of content. We also hope to stress the notion of a comparison, rather than isolated evaluation of the three texts.

IA's: The lecture IA provided for this PC included a discussion and examination of several texts. The lecturer answered specific questions and raised other questions for the group to consider. Information on the format of each publisher's suggested lesson structure was also shared by the lecturer and the group.

The other available IA was an examination of the publishers' materials in the elementary textbook section of the library. Students examined the texts of their choice, and formulated their own conclusions.

Other IA's devised by the students: Students talked to teachers, each other, and to the instructional staff to get information for this PC.

Suggestions: Texts were in great demand, and were often not available in the library for the students' use. Not all of the latest texts are available in the library: here is an instance where a Reading Study Center would have served its function.

PC 2: All of the students were required to attend and participate in a discussion of the value of basal readers in American Elementary Schools.

Rationale: Guidelines for discussion leaders included a consideration of the process of teaching reading, and a discussion of the materials and programs available. Investigation of the comparative value of specific factors in the basal materials was emphasized, and differing points of view were especially invited.

IA's: There were no IA's for this PC because it was an Expressive Objective.

Suggestions: Students enjoyed and benefited from this PC. They suggested that more of the PC's include discussions. The students did request and need discussion leaders; one group was without a rater or instructor as leader, and felt neglected. Groups contained ten or fewer students. The discussions lasted for approximately forty minutes, which seemed to be a good amount of time for the purpose.

PC 3: Each candidate was required to administer a pre-constructed informal reading inventory to one child, and to complete the score sheet for the test. The PC was rated by examination of whether or not the score sheet had been adequately completed. The particular inventory used this semester was compiled by a class in Diagnosis of Reading Disabilities. The purpose of the inventory is to "determine the tentative level of difficulty at which the pupil can read comfortably on his own...and the tentative level of difficulty at which the pupil can function for instructional purposes." Candidates could self-schedule themselves for Mark's Meadow pupils. Mark's Meadow is our campus laboratory school. It is a public school of the Amherst school system. The School of Education cooperates in staffing it, evaluating the staff, and providing an additional stipend for the staff. One of its features is a corridor located above all of the classrooms, providing an audio and visual observation deck (through one-way glass) for observers. Access to this corridor is open during school hours except for Friday, when teachers and students are granted a respite.

Rationale: The informal reading inventory is one of the more individualized and useful means of assessing reading ability. It is not a standardized test, and leaves much room for the tester's individualization as well as for the student who is being tested. This kind of diagnosis helps acquaint the candidate with much of the process of diagnosis.

Suggestions: Students enjoyed this PC because it gave them the opportunity to work directly with children. It did not satisfy the criteria for diagnosis, however, because the form used was designed originally for use with children in need of remediation For next semester we will include directions to the students on how to construct and work with their own I.R.I., instead of our pre-constructed instrument.

IA's: Practice: Candidates were permitted to read the instructions included with the test and to administer the test without handing in the score sheet, in order to practice administering the test before submitting it as the PC. They could practice with any child they chose, including the Mark's Meadow pupils.

TV tape: The TV tape, of approximately six minutes duration, presents an actual test administration. Examiner is a college student; examinee is a fifth grade girl. At the conclusion of the tape, the examiner explains how to score the test.

Lecture: The lecture included a discussion of the rationale for using this instrument for testing. Other forms of the test were described.

Suggestions: A new tape will be made demonstrating the administration of different kinds of I.R.I.'s, both the pre-constructed, and the teacher-constructed. Audio tapes of children being given I.R.I.'s, together with a copy of the passages used, will be made available so that students wanting to practice the scoring procedure can do so conveniently. Additional information on this PC, as well as on all others, is now in the process of being analyzed.

PC 4: SRA's kit of children's cumulative record folders (Cruikshank, et al, Critical Teaching Problems) was on reserve in the library. Candidates were required to examine the folders, and to group the children in a logical set of instructional reading groups. Candidates completed a grouping form provided them in their packets. Three groups were suggested, but candidates were encouraged to use their own judgement and to provide a rationale for grouping in whatever way they deemed effective and necessary.

Rationale: The different approaches and possible variations of grouping further demonstrate the fallibility of the "one-right-way" school of thought. Students are required in this PC to make decisions about the needs of the students, and to suggest a grouping approach to meet these needs.

Suggestions: There are too many cumulative files contained in the folder. To make this PC more valuable and more manageable in terms of time and effort, a maximum of twenty files should be contained in the folder. Although more information is being processed at the moment, students have indicated that this PC was valuable if only for the opportunity to examine students' cumulative records. It is our tentative impression that the wording of the PC did not communicate clearly enough to all of the students that they had the option of grouping as they saw fit. Too many students thought they were being forced into a basal - three group approach. The PC, therefore, will have to be re-worded for next semester.

IA's: Readings in the library: A folder of readings dealing with different ways of grouping and its attendant rationale and problems was placed on the reserve shelf in the library (Five copies of each folder were available for each IA).

Observation in the classroom: Students could make arrangements to observe the reading groups in any classrooms of their choice. Most students who elected this PC either observed in the class where they would do their student teaching, or they went to the Mark's Meadow Observation Corridor and observed the different classes during their reading time.

Lecture: The lecture for this PC stressed variations in grouping should be flexible and pointed to the needs of the individual child.

Suggestions: The folder of readings will have to be revised to include more specific directions for grouping for different purposes. A handout sheet on guidelines for observation will be developed to guide the students if they wish to use the observation IA.

PC 5: This PC requires that the candidate select one or more paragraphs from one or more children's readers, and construct a quiz containing seven questions, testing the child's comprehension of the selected passages. Each question must test a different skill. A list of skills is included in the PC directions. Questions may not be of the kind demanding a "yes" or "no" answer.

Rationale: This PC aims at developing the knowledge of the reading process as well as the ability to evaluate the needs and abilities of the students. Writing thought-provoking, non-literal questions is an important part of diagnosing students' abilities.

Suggestions: We will re-word this PC for clarity for next semester. Students were confused as to how to select their passages, how many to use, and also, as to the meaning of the specific skills we listed. Clarification of the wording would make it clear that the candidate had the responsibility of learning about the skills as part of the process of reading. Perhaps some sample passages from children's books will be included in the PC directions next semester.

IA's: The folder in the library included discussions of various questioning techniques.

Lecture: The lecture contained a very brief survey of research in reading comprehension skills, followed by a discussion of the various levels of comprehension. Emphasis was placed on asking questions which stimulate the thinking process rather than simply tapping the lower levels of questioning, such as rote recall.

Suggestions: The reading folder in the library should be revised to include more information about the specific reading skills being tested.

PC 6: Students were required to select a passage ten sentences in length and write three lesson plans (a suggested lesson plan was included; each demonstrating a different technique for teaching word analysis the candidate had selected from the passage.)

Rationale: Different approaches and techniques are mandatory for the effective handling of this very important aspect of teaching reading. A knowledge of the process of the decoding aspect of reading is gained by an investigation of the different word-analysis skills.

Suggestions: The PC will be re-worded for next semester so that students will clearly understand that they are to devise different activities and different approaches for analyzing any given set of words. The directions in the PC will also include some guide for selecting the words to be analyzed.

IA's: TV tapes: The tapes contained excerpts of lessons using games as devices for teaching word analysis. Different techniques such as phonics, structural analysis, linguistic analysis, and sight word recornition were demonstrated by a group of students, working with small groups of children.

Lecture: The lecture concentrated heavily on word attack through the use of phonics. Books suggesting different activities for use with children in word analysis were exhibited in class..

Suggestions: TV tape: Perhaps additional techniques can be added to the tape. Lecture: The Lecture will be revised to include a discussion of what word analysis entails, and the different techniques and activities that are available for developing and reinforcing this skill. Readings: A list of readings will be developed for this PC as an additional available IA. Many students elected to read on their own for this PC, and found it profitable to do so.

PC 7: This PC contained our only short-answer quiz. Twelve items were listed to be matched. The items required identification of phonics terms.

Rationale: Phonics is the basis of a very widely used technique for word analysis, and is the prime focus of many reading programs. Our candidates, therefore, should have knowledge of this material, and should be somewhat familiar with phonetic principles.

Suggestions: This PC should test more than proficiency in phonics. As a matter of fact, the test as it was constructed did not even test phonic principles. The test must be redesigned and expanded to include some consideration of the reading programs (such as Phonovisual and Economy Company) that use this approach as the mainstay of their program.

IA's: Programmed Text: Programmed Word Attack for Teachers by Robert Wilson was suggested as the text to use. Few students bought it, because they could pass the PC without it.

Library folder of reading materials: This folder contained phonics generalizations, and a discussion of the role of Phonics in a reading program.

Lecture: The lecture dealt primarily with the students' questions about the use of phonics in the program, and to what extent phonic principles in general apply to our language.

Suggestions: Either dispense with the programmed text or include it in the reading folder. Add to the reading folder in the library so that it includes more specific descriptions of the publishers' materials using the phonics program for reading, as well as some notion of the scope and sequence of phonics instruction in the elementary schools. Add to the lecture some specific information about phonics rules. Bring to the lecture some samples of books and other materials using the phonic approach. Add an IA consisting of a section in the Reading-Studies Center, containing Phonics games, books, and as many of the Publishers' materials as are available so that our candidate can examine and try out these materials for themselves.

PC 8: Candidates were given a list of Readers using the Linguistic Approach. Candidates were required to describe the features distinguishing any one of these series as a Linguistic Reader.

Rationale: The linguistic approach to reading is one of the newer approaches. Our students should be aware of it, and know its principles.

Suggestions: Although most students thought that this was a valuable PC, we believe its value for them lay only in the opportunity to peruse a new kind of approach. Next semester we will add a section to this PC requiring the candidates to provide the rationale for the linguistic approach, in addition to the description of what it entails. The new requirement will, hopefully, insure a knowledge of the process of this approach.

IA's: Library folder of readings: contained analyses of linguistic readers, and comparisons of the linguistic approach and others.

Lecture: Included a comparison of the linguistic approach and other approaches, notably the phonic. Also included was a discussion of the rationale for the specific characteristics and principles of the linguistic approach.

Suggestions: Add examination of manuals to linguistic readers as an IA.

PC 9: The student was asked to select one set of sentences (of about 20 words in length) from a given list of 5 sets, and to transcribe these sentences from traditional orthography into i.t.a. Then he was asked to write 2 paragraphs agreeing or disagreeing with the statement that using i.t.a. with beginning readers solves many problems in the teaching of reading. Each student was expected to give at least 3 valid reasons to support his position.

Rationale: i.t.a. is used in many primary grades. This PC required the student to be not only familiar with i.t.a., a relatively new approach to the teaching of beginning reading, but to be able to write it and to be acquainted with some of the findings of research and/or results of i.t.a. experiments in the area. The PC covers a number of levels of the hierarchy (see chart), and perhaps it was for this reason that this particular PC was received with enthusiasm by most of the students.

Suggestions: This was one of the more successful PC's and will, therefore, be kept in its present form.

IA's: Library folder: Included in the library packet were samples of the i.t.a. alphabet and a teacher's manual, as well as a reading list.

Filmstrip and record with alphabet inserted: This packet is commercially prepared by i.t.a. publications, and is a description and rationale for i.t.a.

Lecture: covered the histroy and rationale for i.t.a., an introduction to the symbols of i.t.a., practice in writing words in i.t.a., research findings, differences between American and British approaches to i.t.a. and a summary of pros and cons.

Suggestions: Unfortunately, we could not include as many materials on i.t.a. as we wished, because the materials we ordered did not arrive in time for the program. More books written in i.t.a. would have been helpful, and the manual on how to write i.t.a. would also have helped. However, we have every expectation of receiving these materials in time for next semester. The other IA's were helpful, and need no changes.

PC 10: This PC requires a description, with appropriate emphasis on detail, of five different materials which might be used in the language experience approach to teaching reading. Each material should generate a different activity. The materials and activities should be appropriate for the class the candidate has described (a class description from was provided.)

Rationale: The language experience approach to teaching reading is a creative, effective approach which requires flexibility and imagination on the part of the teacher, as well as an attention to the specific needs of the individual child. It is also particularly well suited to working with the disadvantaged child.

Suggestions: The PC needs to be re-worded so that the students understand that a combination of materials and activities is being asked for. Students also need to have it clearly stated that the language experience approach is a reading approach, not only a creative writing approach.

IA's: Film: The film, Skippy and the Three R's, was available for viewing. This film shows how a perceptive first grade teacher used a child's interests to "turn him on" to reading.

Lecture: included a description of the approach, the rationale, some examples, and a discussion of some of the readings that further describe the approach. In addition, students were taught how to write Haiku, and engaged in a "Haiku experience."

Suggestions: A TV tape will be developed, showing examples of the language experience approach in action in the classroom. Samples of Experience Books will be placed on reserve in the library for student to examine. A reading folder will be prepared for this PC Lecture to include follow-up discussion periods so that students may actively participate in suggesting materials and activities, and get immediate feedback.

PC 11: Candidates were required to conduct interviews with children for the purpose of ascertaining their reading interests and their degree of motivation for reading. This is the initial interview or conference for the Individualized Reading Approach. The form suggested for use in this interview was included in the students' packets.

Rationale: This interview helps a teacher and child to formulate an individualized reading program. Individualized reading is the approach most adaptable to each child's needs and abilities, and is the approach most inclusive of all other approaches.

Suggestions: To the extent that this PC was meant to give our candidates an insight or introduction to the Individualized Reading Approach, it was not successful. The candidates did enjoy conducting the interview, and felt that they learned much from it about children and their interests, but either an additional PC, or an addition to this PC would be necessary for our students to learn of and understand how an individualized program is conducted.

IA's: Lecture: included a rationale for the interview, a description of and rationale for the Individualized Reading Approach, and an examination and discussion of the Guide to Individualized Reading as well as some materials designed for use in an I.R. program.

Library Readings: Two books were placed on reserve for the students' use: the New York City Guide to Individualized Reading and Darrow and Howes, Approaches to Individualized Reading.

Suggestions: The IA's were more than adequate for the PC. These same IA's will probably suffice for the amended PC.

PC 12: Candidates were required to select three reading kits or machines or devices from the materials available in the reading studies office, and demonstrate their use. A list of the available materials was included in the packet

Rationale: Candidates should become familiar with reading materials, other than books, so that they will not be limited in their selection of appropriate materials for their students. They should also understand the proper application of these devices in terms of the skills they are designed to reinforce.

Suggestions: Because proficiency was the level stressed in this PC, that is, the ability to operate the devices, students lost sight of the purpose for which these materials were designed. We, therefore, will add to the PC the requirement that the candidate describe the context within which he or she would use the device.

IA's: Demonstration: explained use of tachistoscopic devices, demonstrated two representative samples of these devices, introduced and explained use of boxed, multi-level programs, and demonstrated use of a representative kit.

TV tape of the above demonstration was made for students' use. Individual practice: students practiced on the machines without observing either the live or taped demonstration.

Suggestions: 1. We need a Reading Studies Center in order to have more room, and a more flexible schedule for using the machines. Wear and tear on the few machines we own was disastrous. More machines and devices and materials are needed if our program is to keep up with today's changing and expanding use of technology in reading. 2. All the raters will be trained in the use of the devices so that they can demonstrate and rate this PC. It is very dull for one rater to have to rate all of these PC's. 3. Printed instructions should be available for all of the materials.

PC 13: Descriptions of classes containing special populations such as Gifted, Urban, Disadvantaged, Retarded, Early Childhood, etc., were filed on the reserve shelf in the library. Candidates were to select either these, or other classes containing special populations, and were to describe one week's activities in the Language Arts for this paritcular class.

Rationale: We believe that the skill of designing a set of instructional activities, leading one from the other, and paced according to the needs of the students is a very advanced and complex ability demonstrating proficiency across all the levels of the hierarchy we have established.

Suggestions: Students were generally satisfied with this PC. The PC itself needs to be re-worded to stress the continuity of the week's activities in a specific area of the Language Arts.

IAs: Observation in the classroom: Students were encouraged to go beyond their practice teaching school and Mark's Meadow School to observe in different populations.

Readings in the Library: Most of the readings described problems of teaching the urban disadvantaged, although some material on other populations was included.

Lecture: After presenting an overview of the problem, the students were divided into small groups, each discussing a specific special population. The last part of the hour was spent sharing the results of the small group discussions.

Suggestions: Special efforts will be made next semester to encourage students to observe a variety of special populations both in traditional school settings and in other situations. The reading list needs to be expanded to include a greater scope of populations. Since the lecture was especially well received by the students who felt they had benefited particularly from the discussions, the same lecture format will be used next time.

PC 14: The candidates were requested to spend an imaginary 100 dollars on their own personal professional library. Instruction in the students' packets included the suggestion that the students select subscriptions to periodicals as well as professional texts.

Rationale: We believed that this PC would expose the students to what is available in the field of reading, and that they would exercise a choice based on their own interests and needs.

Suggestions: Make it more apparent in the wording of the PC that the books are for their professional personal library and not simply their personal library. We need to have on hand more of the books and periodicals the students might select. Somehow we will have to build-in an examination of these materials, not just a card-catalog replica. Although a rationale for each selection was required, students obviously did not have the time or inclination to examine all of the materials. We may have to drastically limit the number of books selected, and require a more complete discussion of each book, or perhaps the candidate may be asked to verbally provide his rationale once he has compiled the list. This could be done in small group discussions so that could receive even more information. This would be an even more valuable experience if the discussants could bring the books to the discussion.

IA's: Browsing in the library. It was hoped that this would enable the students to acquaint themselves with what the library had to offer.

Lecture and tour of the library: the librarian was provided with a copy of the directions for this PC, and planned her lecture tour accordingly.

Suggestions: Some students provided themselves with another IA by going to the offices of each of the Language Arts staff and noting what they had in their libraries. The Browsing IA should perhaps be accompanied by a handout of a map of the library, and a short description of what can be found in each of the sections. The students suggested that for the tour and lecture of the library, one of the Language Arts staff either accompany of take over the job from the librarian. A Reading Studies Center, equipped with special exhibits and clearly marked areas, would be infinitely helpful here.

PC 15: Candidates were given a list of reading objectives and a class description form. After the candidate had described the class, he was to pick an appropriate reading objective and describe three ways of evaluating that objective.

Rationale: Evaluative techniques are part of the basic repertoire of a teacher. This PC combined an understanding of the variety of approaches available, as well as the advantages of using a diversity of measures, with an ability to select methods (and objectives) appropriate to a specific class. (i.e., knowing the evaluative techniques is No. 3 in the hierarchy, using variety is 4a, choosing appropriate methods is 4b).

Suggestions: Although the reading objectives as stated are rather vague, they adapt themselves remarkably well to various class descriptions. However, since writing clear, behaviorally oriented objectives can be considered an important evaluation technique, it might be well to have the student re-write his chosen objective in behavioral terms.

IA's: Lecture: the lecturer described common standardized survey and diagnostic tests and elaborated on the diversity of measures theme found in Unobtrusive Measures (Webb, et al). After the formal presentation, there was a discussion of specific objectives and evaluative methods. Readings in the Library: Material on formal, informal and unobtrusive measures was included.

Suggestions: The lecture was well received and students who attended demonstrated a good understanding of the purpose behind using diverse measures. The original reading packet was supplemented during the program with additional material and needs still further revision. Ideally, the reading packet should include general information on evaluation as well as specific material appropriate to the different objectives. In addition to the isolated list of reading objectives, candidates should have an opportunity to evaluate an objective already described for another PC.

PC 16: Candidates were required to attend a taped demonstration of the WISC; to participate in a discussion afterwards on I.Q. tests in general; and to complete the Dove Counter-balance Intelligence Test.

Rationale: A knowledge of the limitations of I.Q. tests, and the experience of taking a test based on a set of cultural experiences different from his own help a candidate to put these tests into proper perspective in terms of their use in any given classroom for any given classroom for any specific child.

Suggestions: The tape was excellent, but can benefit by some editing. The Dove test was very effective in achieving our aim.

IA's: There were no I.A.'s for this PC; it was an expressive objective.

PC 17: Candidate must describe a class, using the form supplied and select twenty-five books for use in this class as a library. Candidate is required to provide a rationale for each of the selections he makes.

Rationale: A knowledge of what is available in the field of children's literature and the awareness that certain children would benefit from and enjoy certain books (in other words, the notion of encouraging the child to read and finding books particularly suitable for him) are mandatory abilities for good teachers.

Suggestions: Revise the PC directions to be more specific in directing the candidate to "prescribe" a library for the particular class he has described. The PC should be kept largely as is, because of the enormous value inherent in reading and considering many children's books.

IAs: Lecture Series: The series covered such topics as book selection, categories of children's literature, bibliotherapy, modern authors and illustrators, and censorship.

Library Reading List consists largely of annotated book lists.

Suggestions: The reading list will be revised to include a more thorough consideration of bibliotherapy, and the importance of encouraging children to expand their interests and knowledge through books.

PC 18: Candidates were asked to select a passage from a children's book and read it aloud to one of the raters. The raters judged their performance on voice quality (projection, variation, tone), fluency, eye contact, and ability to project the meaning of the passage.

Rationale: This is a proficiency PC designed to test the candidates skill in an area essential to communication and motivation in the classroom.

Suggestions: Whenever possible, candidates were audio taped as they read. Part of the evaluation was having the candidate listen to and evaluate himself. This proved to be a most valuable part of the PC. Since many raters were involved in rating the PC, some time was spent discussing the criteria with them. Raters found this PC enjoyable and valuable, but more time should probably have been spent on preparing the raters for this experience.

IA's: TV Tape. The same tape was available for Nos. 19 and 23. The tape, edited from 2 semesters of the story hours at the Jones Library (part of Masha Rudman's children's literature course) demonstrated a variety of story telling techniques, as well as providing a rationale for selecting stories.

Lecture: Various story telling techniques were presented including puppets, mime, narration, and use of media. Specific techniques used in story telling were demonstrated.

Practice: Students were encouraged to practice reading stories to children. Children were recruited wherever possible; however, no organized story telling activity (such as the library reading hours used in the children's literature course) was scheduled.

Suggestions: TV tapes turned out to be unpopular IA's. TV monitors were difficult to find, often unavailable, or in poor repair. We also discovered that our students were not familiar with TV monitors and were hesitant to use such impressive looking equipment. Finally many of the students claimed to be "turned off" by TV. "I can't concentrate". "It's too boring.") However, when they were forced to sit in front of the TV screen (PC 16), they were most enthusiastic, rooting for the little boy, agonizing over his every mistake. Next semester machine competency, plus an early exposure to exciting TV tapes, might solve this problem. Practice for any proficiency PC has obvious advantages. For this PC, practice with children is clearly desirable. When students come into the program earlier and spend more of their time working with children on an individual and group basis and in formal and informal situations, a great deal of experience should be provided.

PC 19: Candidate is required to select a story and write three lesson plans (suggested form provided), each describing a different way of presenting this story. Not only were the different methods of presenting the story evaluated, but also their suitability to the story was weighed.

Rationale: Here again we are aiming for diversity and appropriateness of approach. It is also important for teachers to be aware that stories can be presented in many motivating and entertaining ways, in addition to simply telling or reading them.

Suggestions: Lesson plans will no longer be required for this PC. The candidates will, instead, describe the presentation. But some rewording must be done to stress the necessity of appropriate methods.

IA's: TV tape. This tape consisted of excerpts from the Jones Library story hours conducted by Masha Rudman's Children's Literature Class. Comments are narrated throughout the tape to make it particularly applicable to this PC.

Library Reading Folder contains descriptions of various ways to present stories effectively.

Lecture: Margaret Thompson brought puppets, the TV tape and numerous resource references to use as the basis of a discussion and demonstration session.

Suggestions: Other than the suggestions we have already made for ready availability of the TV equipment, we would add constant revisions and additions to the library folder.

PC 20: Students were required to describe in detail three different approaches for motivating creative writing. Candidates were to design these approaches for a specific class they had described on the form provided for them. Candidates were informed that they would be rated on their originality, diversity, and appropriateness of activities.

Rationale: We expect that the candidates will learn to match their activities with the needs of the students. We also hope to encourage the candidates to value creativity on the part of their students.

Suggestions: Somehow the PC must be reworded to make it perfectly clear to the candidates that we are rating them on their motivation of their students creativity, and not on the "cleverness" of their own devices. Good teachers can borrow from books and each other, provided they exercise taste and wisdom in their choice of borrowed activity. We do not expect activity to be original with the candidate.

IA's: Library reading folder contained many ideas for motivating creative writing. Observation in the elementary classroom was recommended for this PC. The Lecture included a consideration of the various forms of creative writing as well as some ideas for its motivation.

Suggestions: Add to the reading folder some discussion of the various forms of creative writing. Incorporate the Haiku experience into the lecture on creative writing rather than in the lecture on experience approach to reading. Include some samples of children's work in the folders as well.

PC 21: Candidates were given a list of 50 words from which they were to choose 20. They were then to describe one formal and one informal approach for teaching these words.

Rationale: Students were encouraged to differentiate between informal and formal approaches and to demonstrate their understanding of these terms by describing the words to be taught.

Suggestions: Asking candidate to use an informal approach with a prepared word list is logically inconsistent, and was confusing to the students. The word lists should be eliminated and the candidates asked to develop spelling activities for a class of their choice. This approach would require a knowledge of the sequence of spelling skills, an awareness of the diversity of approaches to teaching spelling and the ability to choose activities appropriate to specific children.

IA's: Reading in the Library. Reading covered formal and informal approaches and a variety of reading on the sequence of spelling skills.

Observation in the classroom. As with other observation IA's, few students took this alternative, not because of any inconvenience, but because without direction they did not know what to look for. (One student who did observe, watched a particularly uninspired lesson, and when she used it as one of her two approaches, failed the PC).

Lecture: The lecturer covered various approaches to the teaching of spelling, as well as some of the theories on the sequence of spelling skills.

Suggestions: With the suggested changes in the PC would come changes in the reading. This PC would lend itself particularly well to a TV demonstration tape.

PC 22: Candidates were required to write two sentences on the chalk board one in cursive form and one in manuscript.

Rationale: Teachers should be able to communicate clearly via the chalk board.

Suggestions: Surprisingly enough, candidates almost unanimously agreed that this was a valuable, if obvious, PC.

IA's: Packet of handwriting materials. This packet (we had only one set) was located in the Reading-Studies Office. The packet included sample alphabets, instructions on how to form letters, and two curriculum guides to teaching handwriting in the elementary schools. The lecture alternative included a demonstration of how to form letters, and some review of the principles of legibility (such as spacing, size, etc.) Most of the students elected the third IA, self-directed practice.

Suggestions: There are many approaches to the teaching of handwriting, and problems such as teaching writing to the left-handed child that we did not touch in either our PC or IA's. When the program is operational, we will include at least one more PC on handwriting so that we may tap more than the first level of the hierarchy.

PC 23: Candidates were required to describe a class, using the form provided. They were then to describe 3 different dramatic activities for use with this class. At least two of the activities were to be informal.

Rationale; The PC was designed to give the candidates an insight into how drama can be used in the classroom. This PC was also designed to insure that the candidates become aware of the area of of creative dramatics. The PC also aimed to reinforce the idea of fitting the activity to the class. Drama should be as much a part of a teacher's repertoire as any other effective methodological structure.

Suggestions: The PC was a popular one; students became aware of the different ways they might incorporate drama into the curriculum. We will not change this PC.

IA's: TV tapes. We developed two TV tapes, one illustrated drama in the classroom: two elementary school classes were taped (the teachers were Cynthia Hall and Brian Anderson of the Mark's Meadow staff); the other was the Jones Library tape, which contained many examples of both formal and informal dramatic presentations. The lecture dealt with the use of drama in the classroom, and presented many different activities for informal drama. The students were encouraged, during this lecture, to paritcipate in some informal dramatic activities.

Suggestions: Increase participation of the candidates in class. This was a valuable experience in the lecture time. Some of the students suggested that more PC's especially of this type, be demonstrated "live" by the candidates. A reading folder will be developed for this PC. Some candidates suggested that attendance at a play would be a good expressive objective.

PC 24: The candidate received a list of speech objectives adapted from the New York Board of Education's Toward Better Speech. The five categories of objectives were attitude, voice, phrasing, tempo and practical application. Candidates were to describe a class, choose one objective from the list supplied, and describe three alternative methods for achieving this objective. Candidates were rated on their variety of approach, appropriateness of activity and originality of method.

Rationale: Since speech is such an important part of the communication process, we generated several PC's in this area, each dealing with a different level of the hierarchy: this PC was designed specifically to help candidates understand the process involved; "story telling" (PC 18) emphasizes proficiency; "presenting a story" (PC 19), and "dramatic activities" (PC 23) stress using a variety of approaches.

Suggestions: Few people made use of multi-media techniques. Many were concerned that their own ideas be creative, rather than that their ideas foster creativity in the children. Rewording the PC might encourage a more child-centered approach.

IA's: Library Reading. Reading emphasized sequence rather than activities.

Lecture. Lectures discussed the emotional implications of speech and the role of the classroom teacher. Individual speech objectives were discussed, and numerous ideas for activities were presented.

Suggestions: Library readings need to be revised in favor of more activities encouraging creativity in the children. Since speech activities are somewhat easier to observe than more esoteric educational practices (listening, for example), classroom observation (with observation protocol) might be included.

PC 25: Candidates were required to describe a class, using the form provided. They then were asked to select a listening objective from a list of listening objectives provided in their packet appropriate to the class, and were then to generate three activities designed to achieve the selected listening objective for this class.

Rationale: Listening is an all too frequently neglected area of the Language Arts. It is, however, a very important part of this content area. We, therefore, expect that our candidates be prepared to pay attention to the listening needs of this students, and to provide appropriate activities for them.

Suggestions: Few people made use of multi-media techniques. Many were concerned that their own ideas be creative, rather than that their ideas foster creativity in the children. Re-wording the PC might encourage a more child-centered approach.

IA's: Self study, using the listening objectives. Lecture, unfortunately, was cancelled due to scheduling problems.

Suggestions: A reading folder will be compiled. Some audio tapes with listening activities will be developed.

PC 26: Candidates were required to compile a 25 item annotated bibliography in a subject area of their choice. Annotations were restricted to two sentences per item. Diversity of material and applicability to area chosen were expected.

Rationale: It was hoped that this PC would provide the students with an opportunity to explore some area of special interest and to acquaint them with various information sources available in the library (specifically the Education Index and ERIC).

Suggestions: This PC somehow confused proficiency (the ability to compile book lists) with knowledge of a variety of materials . The result was unfortunate. Students regarded the PC as a chore. Even those whose lists represented a good variety of material admitted to having never opened any of the material. If proficiency in the use of library sources is desired, emphasis should be placed on the Education Index, and especially ERIC, which are less familiar to the students than the card catalogue. Proficiency could be tested in far fewer than 25 items. If the purpose of the PC is to allow the student to explore one area in depth, a short summary of material would give students the time to do the reading.

IA's: Lecture. The lecture was given by the School of Education librarian, and was billed as a lecture and tour of the library. Unfortunately, touring was impossible during library hours, and emphasis was placed on the more familiar library materials.

Browsing in the library. Many students used this IA.

Suggestions: The lecture should be changed as suggested under the lecture description. A page of guidelines would be helpful for the browsers.

PC 27: The candidates were asked to discuss the statement "Readiness for reading involved a combination of factors which a teacher of reading must consider." They were told that they would be rated on the comprehensiveness and specificity of the factors that they mentioned. It was hoped that candidates would consider the complexity of the process of readiness, different for each individual, and relative to the task that is required.

Rationale: It is important for a teacher to be aware of the process of readiness for learning anything at any level, but particularly important for him to be aware of the process of readiness for beginning reading.

Suggestions: Students (a few of them: 9 out of 120) objected to this PC on the grounds that it required nothing more of them than regurgitation of information found in the readings. They, therefore, suggested that additional PC's, or additions to this PC, include some practical application of the knowledge they had acquired. For our PC we demanded only one level of the hierarchy. These candidates evidently felt the need to include more levels.

IA's: Reading folder in the library contained a list of readiness factors, and some articles on readiness. The lecture included a history of the reading readiness concept, a discussion of present day trends, pre-school reading, Doman, Durkin, O.K. Moore, Montessori, and other experts in the field, and the idea that a relative concept of reading readiness is needed. The other IA suggested that candidates observe pre-school, kindergarten and first grade classes.

Suggestions: We will develop a TV tape of pre-school and young children engaging in readiness activities.

PC 28: Candidates were given the statement: "Beginning Reading Instruction must include procedures for acquiring word analysis skills and procedures for memorizing whole words". They were then required to write a paper either defending or attacking the statement.

Rationale: We expect that performing this criterion will aid students in gaining a knowledge of the process of decoding.

Suggestions: We plan to incorporate this PC with PC 6 so that together they will cover all of the levels of the hierarchy.

IA's: Library reading list contains discussions of the process of decoding. The lecture included discussions of the various points of view concerning beginning reading and word analysis. The lecture was, in fact, combined with the lecture for PC 6.

Suggestions: We will combine these IA's with the IA's for PC 6.

We will include for each PC the suggestion that candidates talk it over with other people as one of their IA's. We will continue to act on the feedback we receive from raters, candidates and cooperating teachers in the field, as well as our instructional staff and from any consultants or outside observers who may visit our program.

We have not included a section of the specialists' PC's (rating PC's, presenting lecture IA's preparing packaged IA's such as reading packets for TV tapes and designing an evaluation program) because although we used them, we did not actually test them, or gather data on them. We plan to include these and other specialist PC's in the future.

Educational Feasibility

Findings from analysis of quantitative data. The evaluation was conducted by a doctoral student concentrating in reading and evaluation. The actual gathering of the mass of data was so time consuming that data processing was delayed until the end of the program. Next semester data collection will be indfinitely more efficient and will provide immediate information on student performance and suggestions as well as on facilities and time usage (we will probably use a combination of a computer program and the digitek system.)

The evaluation of any teacher training program must follow the teachers into the classroom. This follow-up study cannot begin until after the final report is due and hence is not included in it. It will be added in an addemdum report.

Facilities, Equipment and Materials

Personnel. For the feasibility study, we had an instructional staff of one assistant professor, David Yarington, one instructor, Masha Rudman, and one teaching assistant, Margaret Thompson. These three staff members provided the lectures for the twenty-six PC's carrying lecture as an instructional alternative. A fourth staff member served as program evaluator.

In addition, four undergraduates, five Masters candidates and seven Doctoral candidates served as raters. Raters were part of the instructional as well as testing staff: they commented and suggested alternatives to students in written messages, as well as in oral conferences during office hours and on the telephone.

We had one part-time clerical assistant, and one part-time undergraduate assistant.

If our program grew no larger, we would need one competent rater for every five students, and the equivalent of four lecturers and one evaluator (experienced raters will be encouraged to lecture in their area of expertise). We would need one full-time clerical assistant. We would also need one instructional aide to keep the instructional alternatives in order and up to date.

A rater's workshop will be offered next semester. Raters will be required to "walk through" each of the PC's; that is, they will do each of the IA's and will participate in small group discussions on each PC. These sessions will begin 3 weeks before the candidates begin their program. It is estimated that a ratio of 1 rater to 5 students will be adequate We strongly suggest that those people who supervise student teaching participate in the raters workshop and/or that raters and supervisors be one and the same.

Scheduling. Our program was scheduled for a five week module sequence. Students could attempt the PC's in any sequence, and could submit them in any sequence at any time within the five week span. They could also complete the instructional alternatives at any time with the following exceptions:

1. Lectures were scheduled. A schedule of topics, dates and lectures was handed out to each candidate, and posted on the door. But each lecture was audio taped so that students could hear the lecture at a later date even if they had not attended the lecture.

2. Contacts with children for PC 3 (Informal Reading Inventory) and PC 11 (Initial Interview) were self-scheduled: candidates signed up for

these contacts on schedule sheets posted outside the Mark's Meadow classrooms.

3. Theoretically, candidates could view video tapes and listen to audio tapes at any time, but in actuality they had to arrange for this well in advance. With a reading-study center, this will be remedied.

4. Sign-up sheets were posted outside Room 2 for candidates to self-schedule their story reading and handwriting PC's. (18 and 22).

5. Library IA's were regulated only by the library hours. Students were restricted to using most of the materials in the library.

6. The linguistic readers, reading lists and machines were available on a self-scheduling sign-up sheet, but the hours were limited to the morning.

7. All observations could be self scheduled, or performed without any scheduling necessary on the Mark's Meadow observation corridor.

8. Raters' office hours and Room 2 office hours were the only scheduling restrictions placed on conferences, feedback, questions and handing in and picking up of completed PC's.

9. Expressive objectives (PC's 2 and 16) were pre-scheduled and mandatory. General information sessions at the beginning and end of the program were pre-scheduled and mandatory. Test batteries for the purpose of gathering data from all of the candidates were administered at the mandatory sessions.

For the future there will be no arbitrary imposition of a time limit. Students will be free to schedule these PC's at any time from their Freshman semester to their Senior year.

Again, if we had a Reading Studies Center, students would not have the problem of too few hours of availability of the reading machines and kits. The Linguistic Readers were also unavailable except for the morning hours, and were needed for PC 8.

Next semester we plan to schedule one hour per week's conference and counseling time for each candidate. We will divide the candidates into groups of ten, and post a schedule of optional small group discussions, questions, and counseling on PC's. Each conference hour will be presided over by an experienced rater or member of the instructional staff.

Another aid to flexible scheduling next semester will be audio tapes of all lectures specially prepared in advance so that all are available for listening from the first week of the semester. This, of course, will not benefit those students who attend lectures for the interaction, discussion and immediate feedback they afford, but it will be of service to those students who prefer to learn aurally.

One of the needs we will have to handle is for candidates' more direct contacts with children. More facilities, such as a reading clinic, affiliations with special classes, and elementary schools in locations other than Mark's Meadow, will aid the program as well as the scheduling problem.

We were limited by scheduling and equipment restrictions, so that we were unable to schedule demonstration lessons conducted by the candidates. This kind of actual experience built into the program would immeasurably increase its effectiveness. When the METEP program is operational, perhaps some of the problem will be alleviated by the pre-practicum experiences, such as micro-teaching, which are incorporated into the Behavioral and Human Relations METEP components.

We assume that students may begin participation in the program as early as their freshman year, and that early participation in the program will provide students with many opportunities for contact with children.

Management. This semester planning decisions were shared by the two Language Arts staff members, David Yarington and Masha Rudman, who codirected the component. Most of the in-operation decisions were made by Masha Rudman whose office was the central communication station for the staff, 120 METEP students and the 16 raters. The evaluation program was planned and administered by a doctoral candidate, Mary Alice Wilson. It should be noted here that the Language Arts Feasibility Study is the subject of Masha Rudman's and Mary Alice Wilson's doctoral dissertation. It seems clear that decision making (planning, operation, replanning) must be the prime responsibility of one or at most a very few people. On the other hand, a great deal of the actual operation of the program: office routine, preparing packaged IA's, leading discussions, running the evaluation can be done by Language Arts specialists-in-training who are given enough responsibility so that they may have a valuable learning experience. Since the staff will continue to differ in terms of background and abilities, one of the most crucial decisions is the assignment of responsibilities at the beginning of each semester. A component director and assistant or co-directors would suffice as management heads.

Space, size and types. This semester Language Arts used: an office, a lecture hall, the reading and study center (small room with machines), the lab school classrooms and observation deck, the library, rooms for watching TV tapes.

1. The office was too small (and also belongs to one of the Language Arts staff who was practically homeless for 5 weeks). A larger office is needed for serving as a central communications center.

2. The lecture room was satisfactory in size, if aesthetically unappealing. It would be desirable to have rooms available for small group discussions.

3. The reading and study office, designed to help university students with their reading problems, was severely taxed (and the machines harshly used). Equipment should be rented each semester specifically for practice use by METEP candidates. This office needs to be incorporated into a reading-studies center.

4. The teachers in the Mark's Meadow lab school were most generous with their students and facilities. The observation corridor is so designed that the observer is looking down on the students and sees few of the facial expressions of teacher or students, and thus learns little but the traffic-pattern of the elementary classroom. Perhaps some anecdotal comments, and pictures of the children with some description of what is being attempted in each class, and guidelines for observation could be compiled into handouts for use in the corridor.

5. The library was heavily used, but seemed to withstand the strain. Longer hours, especially on weekends, might have eased the burden.

6. There was no special place established to watch TV tapes. Theoretically, rooms in the lab school were available after class hours, but teachers' meetings and other activities made the students uncomfortable about using the facilities. A well designed Reading Studies Center is a requirement here. All of the above needs can be met by a center of the design submitted by our component.

Equipment. Audio-Visual. As reported previously in the report, TV monitors were not available as promised, and directions for their use soon disappeared from the equipment. Candidates were, therefore, reluctant to attempt the IA's requiring the use of this equipment.

Audio-visual equipment needed during the program, especially TV cameras, were always available when promised. An original plan to document the program with a TV tape had to be abandoned in the face of constant frustration over equipment.

We had only one audio tape recorder, which was in constant use for recording lectures, meetings, and for the evaluation of students who were reading stories, as well as for playing back lectures for students who had missed them. We need at least 10 recorders, 5 of which should be battery powered.

Duplicating. At the beginning of the program each of the 120 students received a packet of 136 pages. Each rater received 2 packets of 12 pages each. The ability test battery added another 11 pages per student, and the final questionnaire 14 more. Add 3 pages of Haiku and 3 or 4 other reminder notes placed in each student's file during the program and the pre-program preparation of 5 duplicate packets of reading materials for 15 different library PC's and some of the problems of duplicating become understandable. Only the xeroxed library reading packets were compiled by the duplicating staff. Other materials were typed, duplicated, collated and stapled by the Language Arts non clerical staff after the duplicating staff had left for the night. The school's duplicating staff tried to keep up with the crush of work, but a full-time clerical aid would be a necessity, and more duplicating equipment would be helpful for a well run program.

Reading machines, books, publishers materials, the newer and later approaches in reading are needed. Only one set of Linguistic Readers (belonging to Masha Rudman) was available to the students; the few available reading machines had to be shared with the adult reading education group, and crucial materials, such as a complete set of SRA kits, Craig Readers, and many other reading devices commonly found in today's schools are absent from our program. Here again is demonstrated our need for a Reading Studies Center.

Office equipment, such as an electric typewriter, dictating and transcribing equipment, and an extension telephone were sorely needed. File cabinets and bookshelves to hold students" records and information will also have to be added to the equipment list.

Although the effectiveness of the program will certainly be enhanced by the addition of all of the above suggestions, it is to the credit of the students, the staff and inherent viability of the program itself that given the above needs, the program was, nevertheless, successful and significant in terms of the students' preparation for teaching the Language Arts.

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APPENDIX A

LANGUAGE ARTS READING PROGRAMS

ROOM #1

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	8	Tachomatic 500 Reading Trainer 121B/Psychotechnic	295.00	2065.00
2	2	Remote Tachomatic 500 Reading Trainer 221B/Psychotechnic	345.00	690.00
3	10	Reading Pacers #121 Shadowscope/Psychotechnic	92.00	920.00
4	10	Reading Pacers # Model B Reading Ratiometer/Audio Visual Research	39.95	399.50
5	10	Tachistoscope Range 4 sec-1/100 sec T-Matic 150-B/Psychotechnic	124.40	1245.00
6	2	Tachistoscope Range 4 sex-1/100 sec T-Matic 150/Psychotechnic	99.50	199.00
7	1 ea.	All programs with Tachomatic 500/T-Matic 150/Psychotechnic		4196.00
8	2	Craig Readers CR-2A-V Reading Pacer/Tachistoscope/Craig	249.00	499.00
9	1 ea.	All programs with Craig Reader CR-2A-V/Craig		1052.00
10	3 ea.	Tachistoscope - Mark I Projector TP1/Learning Thru Seeing	129.50	378.50
11	5 ea.	Tachistoviewer - T.O.V. Viewer/Learning Thru Seeing	89.50	447.50
12	1 ea.	All programs with TP1 Projector/Viewer/Learning Thru Seeing		1802.20
13	5	Language Masters 711B w/ATC 701 Headphone microphone	290.00	1450.00

LANGUAGE ARTS READING PROGRAMS Continued

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
14	1 ea.	All programs with Language Master 711B/Bell & Howell		2547.00
15	100 ea.	Sets of Blank Cards for Teacher Training Sizes to be 3 1/4 x 5, 3 1/4 x 7, 3 1/2 x 9, 4 x 13, 8 1/2 x 11	30.50	3050.00
16	3	Hoffman Readers Mark IV Projector/Hoffman	389.00	1168.00
17	3	Listening Stations H1S-1/Hoffman	67.95	203.84
18	1 ea.	All programs with Mark IV Projector/Hoffman		3081.24
19	2 ea.	Mast Teaching Machine Programmed Reader #1700/Keystone	245.00	490.00
20	1 ea.	All Reading Materials with Model 1700		413.00
21	10	Controlled Readers Junior/Educational Developmental Laboratory	202.00	2020.00
22	5	Senior Controlled Readers/Educational Developmental Laboratory	275.00	1375.00
23	1 ea.	All programs with controlled Readers/Educational Developmental Laboratory		3545.00
24	1	Tachistoscope Tach X Projector/Educational Developmental Laboratory	265.00	265.00
		TOTAL-------------------------------		$33,952.28

PREPARED TAPES LANGUAGE ARTS

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	1 set	K-12 Teaching Tape Program LP206/Classic Text Tapes		742.29
2	1 set	Gateway to Good Reading Cassette/Imperial International		319.00
3	1 set	St. Louis Speech Program Cassetts/Imperial International		238.00
4	1 set	Primary Reading Program Cassette/Imperial International		163.00
5	1 set	Enrichment Stories Palace in the Sky/Imperial International		99.95
6	1 set	Golden Anthology of Children's Verse/Imperial International		40.50
7	1 set	Kit A Our Daily Words/Imperial International		22.95
8	1 set	Kit B Our Daily Words/Imperial International		68.85
9	1 set	Meet the Authors, Children's Literature/Imperial International		110.00
10	1 set each	Kit C-D-E Our Daily Words/Imperial International		264.00
11	1 set	Intermediate Reading Program/Imperial International		339.00
12	1 set	Literature 18th and 19th Century Poets and Poems of England Cassette/Imperial International		79.95
13	1 set	Elements of Good Diction/Imperial International		104.25
14	1 set	Phonics K-3 Cassette/Imperial International		45.80

PREPARED TAPES LANGUAGE ARTS Continued

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
15	1 set	Aural Reading Lab Grade 7-9 Cassetts/Imperial International		329.00
16	1 set	About the English Technical Library Cassette/General Electronic Laboratory		400.00
17	1 set	Higher Horizons - Speech Correction/General Electronic Laboratory		200.00
18	1 set	Language Arts Program - Cassette/3M Wollensak	7.95	1023.50
		TOTAL------------------------		$4,590.04

TRANSPARENCIES FOR READING

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	1 series	Pre-Reading Activites for Young Children/Creative 50 Transparencies	248.00	
2	1 series	Let's Look, Talk and Write/Creative 50 Transparencies	248.00	
3	1 series	Stories on Transparencies/Creative	370.00	
4	1 series	Check and Choose Primary and Intermediate/Creative	60.00	
5	1 series	Vocabulary Builder/Creative	139.50	
6	1 series	Sounds of Poetry/Creative	124.50	
7	1 series	Reading Skills I/Creative	480.00	
8	1 series	Reading Skills II/Creative	165.00	
9	1 series	English Grammar I/Creative	312.00	
10	1 series	English Grammar II/Creative	165.00	
11	1 series	Elements of Fiction	125.00	
12	1 series	Language Development/General Aniline and Film	318.25	
13	1 series	How to Use A Library/General Aniline and Film	187.00	
14	1 series	Structural Grammar/General Aniline and Film	678.00	

TRANSPARENCIES FOR READING Continued

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
15	1 series	English Composition/Tecnifax	37.50	
16	1 series	Library Instruction/Tecnifax	87.50	
17	1 series	Dictionary Skills/Tecnifax	69.95	
18	1 series	Visual-Lingual Reading Program 1710/Tweedy	249.00	
19	1 series	Elementary Reading Readiness/United	257.00	
20	1 series	Reading and Language Development Skills	257.00	
		TOTAL------------------------------------		$4,576.95

SELECT A LESSON DIAL ACCESS SYSTEM

ROOM # 6

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	25	Positions with capacity for audio & visual response headset at each position.		
2		Complete console capable of feeding simultaneiously 25 programs		
3	1	Process	12000.00	12000.00
4	4	Cards	732.40	2929.60
5	1	Video Card	269.20	269.20
6	1	Audio Control	4000.00	4000.00
7	1	Program Count Meter	700.00	700.00
8	1	Cross Bar Pack/wiring	3500.00	3500.00
9	1	Cross Bar Switching	1900.00	1900.00
10	1	Video Control Cabinet	6000.00	6000.00
11	1	Video Cross Bars	2100.00	2100.00
12	1	Program Amplifier Cabinet	1500.00	1500.00
13	1	Program Amplifier Card 6 Stations	800.00	800.00
14	1	Program Amplifier	5100.00	5100.00

SELECT A LESSON DIAL ACCESS SYSTEM Continued

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
15	1	Program Amplifier Card Shelf	420.00	420.00
16	1	Dial Access Student Position Housing	230.25	230.25
17	1	Dial Access Student Position	1500.00	1500.00
18	1	Program Amplifier Power Supply	400.00	400.00
19	1	Excessory Cable	500.00	500.00
20	1	Progarm Source Reel to Reel	6300.00	6300.00
21	1	Four Channel Palyback Amplifier	6300.00	6300.00
22	1	Cabinet Rack	800.00	800.00
23	25	EDC Headsets		1250.00
24	25	Student Booth		3750.00
25	36	Video Program Sources		136,000.00
26	25	Student Moniters		5875.00
27		Installation		20,800.00
		TOTAL-------------------------------		$229,318.45

TWELVE CHANNEL WIRELESS SYSTEM WITH CUSTOM CONSOLE AND DUPLICATING CAPACITY

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	1	Twelve Channel Transmitter and Loop		1,200.00
2	25	Wireless Headsets Twelve Channel S50H	90.00	2,250.00
3	1	Custom Console Containing 10 Cassettes Tape Recorder Playback Units, One Reel to Reel Tape Recorder Playback and one 4 speed Record Player		3,000.00
4	2	Cassette Tape Recorder Duplicators C-1000 Pentagon		3,750.00
5	5	Wireless Twelve Channel Headsets with Boom Microphone ATC S51DH	100.00	500.00
		TOTAL----------------------------		$14,450.00

TESTING EQUIPMENT AND MATERIALS

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	5	Visual Survey Service - Complete Set No. 630.613/Keystone	316.00	1580.00
2	1 ea.	All Supplimentary Tests for No. 46 Telebinocular		391.00
3	3	Audiometer 3 Bell Portable Screener/Eckstein Bros.	150.00	450.00
			TOTAL-------------------	$2,421.00

FURNITURE

ITEM	NO.	DESCRIPTION	UNIT	TOTAL
1	25	RCA Carrels No. EDC16 with light, electrical outlet, projector shelf and screen #Room 1	126.30	3150.00
2	3	McNeff Horseshoe Conference Tables #Room 6 SE6066J	144.00	432.00
3	1	McNeff Charging Unit No. SOS-2, SDC6, SCV-2, SOS-1 No. SKS-0, SEP-1, SCF-5, SCR-0 ERoom 11 No. SSGDA		1619.10
4	2	McNeff Circular Tables 48' No. SE48QR Room 6	61.00	122.00

TOTAL----------------------------$5,323.10

SCIENCE

Introduction

Goals. Science is both product and process. Teachers in most schools are more concerned with the former than the latter and teach to these ends. It is little wonder that our future teachers are concerned with these ends and are a means of perpetuating the status quo in teaching of science, for they are the products become producers in a self perpetuating system.

How then can we break the circuit long enough to install a parallel but alternate route to another destination? If we are concerned with process as well as product it should be possible to involve the students in process to the extent that they will be aware of more than facts which are often erroneously thought of as synonymous with science (or any other area of study). There should be things that they can do with science knowledge. Is it enough to say that a student has amassed sixteen credits in biological and physical sciences and therefore can be certified to teach? Or can we attempt to identify some behaviors which should be performed by a teacher?

Obviously, we cannot hope to identify a group of behaviors acceptable to all science educators. Therefore, we have searched the literature and perused the latest developments in curriculum and scanned the future through the eye of the dreamer as well as the sceptic. The two hundred performance criteria which resulted are an educated guess for a model of the complete teacher of science in the elementary school.

The behaviors were chosen from the areas of biology, chemistry, physics, geology, astronomy, pedagogy and the skills which cross all areas.

Our first goal was to discover what product was being delivered to us in terms of their science "content" background. Were they, for example, able to use a microscope properly or order unknown rocks according to their hardness?

Secondly, if they were unable to pass these criteria, could we supply routes of instruction (or review in many cases) so that they could pass the criteria within a reasonable amount of time. We were aware that not all people learn best from the same kind of instruction. Even more, most people learn different types of material best from many different modes of instruction. As a third goal we hoped to make our charges aware that there were many modes of instruction and that all were viable at some time or another for one purpose or another.

Fourthly, we wished them to be aware that the inability to pass a criterion was not failure but merely a way of assessing their own weaknesses which could be strengthened via alternative routes of instruction. We wished them to pursue their goals at their own rates in ways most expedient to them at any particular time and colored by their particular mood or mind-set.

Fifth, it was our intention to test the value of our instructional alternatives by measuring failure rates versus success rates.

Sixth, it was our hope that while doing the study we could also provide learning experiences which would be of value to the subjects during their immediate student teaching practicum and in the years of teaching to follow. This goal must be tested in a future study.

Within the study we hoped to find the answers to other questions such as:

1. Given alternative routes of instruction, which routes would be most and least popular?
2. Does science background affect ability to pass certain criteria in pretests?
3. What was the average time for each instructional alternative?
4. What was the average time spent in passing each criteria?

Since it was unrealistic to attempt a passage of all two hundred criteria in a four week testing and learning period, forty-four criteria were chosen on the following basis:

1. Criteria should be generalizable to others in the same general category, e.g., biology, skills, pedagogy.
2. Criteria should be realistic in time schedule allotted.
3. Criteria should cover all general areas.
4. Criteria should include some hierarchical types.

The fourth point above refers to the hierarchy of skills and behaviors which were present in the criteria list. For example, ability to calibrate the field of a microscope and ability to estimate the size of a specimen presupposes the ability to calibrate the field.

In addition to the testable behaviors, the science group included a group of experiential criteria which required no more than participation on the part of the student, e.g., participating in a laboratory for designing and building equipment, using inexpensive materials. It was believed that the experiences were valuable but that outcomes were not necessarily measurable in behavioral terms.

A brief overview of the performance criteria follows. A complete list can be found later in the text.

1. using the library to find appropriate reference material.
2. changing text activities to open-ended activities.

3. writing open-ended activities
4. writing open-ended questions.
5. designing discrepent events for motivation to inquiry.
6. categorize divergent and convergent questions.
7. compare curricular programs.
8. participate in group discussions on student involvement.
9. take an exemplary test.
10. play with materials of inquiry type curriculum.
11. read children's science periodical.
12. read teacher's science periodical.
13. witness exemplary lesson using media.
14. participate in lab equipment building lesson.
15. plant seeds and keep log.
16. estimate size of specimen in microscope field.
17. calibrate microscope field of vision.
18. use microscope.
19. strip wire.
20. bend glass tubing.
21. mix acid and water properly.
22. break glass rubing.
23. fire polish glass tube.
24. smell gas.
25. fold and use filter paper.
26. solder two wires.
27. classify objects three ways.
28. make dichotomous key.
29. use dichotomous key.
30. make galvanometer.
31. - 34. measure voltage drop.
35. measure current flow.
36. pass battery and bulb paper test.
37. order rocks according to hardness.
38. calculate density of liquid (also passes 39. - 43.)
39. calculate density of object given mass and volume.
40. calculate volume of irregular object.
41. weigh object to 1% accuracy.
42. measure given amount of liquid.
43. use tare skills to measure 30 grams of water.
44. calculate density of irregular shaped solid (passes 38. - 44.)

Outcomes of the Feasibility Study. All outcomes of this study are based on the evidence which is included herein. Inferences are made in many cases where statistical evidence is weak or lacking.

Part two of this study includes the design of the study while Part three includes suggestions for revision and the implications of the study.

We can state our confidence in the feasibility of this type of program with larger numbers from both a pedagogical and logistical point of view.

Design and Implementation of Pedagogical Feasibility Study

Description of study steps with rationales. 1. During Phase I of the METEP program an exhaustive search through educational literature revealed many studies which alluded to some of the information we required. Much information was obtained from curriculum guides provided by the Science Curriculum Improvement Study, University of California, Berkeley; Science - A Process Approach - A.A.A.S., Xerox Corporation; C.O.P.E.S., Department of Physics, New York University; Elementary Science Study; Educational Development Center, Newton, Massachusetts; Minnemast, University of Minnesota, Minneapolis. These manuals and literature provided by these projects provided the group with volumes of data which were analyzed for clues to teacher competencies needed to teach such programs.

2. Over two hundred performance criteria were designed to measure those behaviors chosen in Step 1. Data were estimated on the following factors concerning each PC.

a. How long would it take to test each performance?
b. What instructional alternatives are available and appropriate for each PC and how much staff time would be necessary?
c. What materials, equipment and setting are necessary for each PC and IA?
d. Hierarchy - if a student can pass one terminal PC, can we assume he can pass a number of related PC's?
e. What PCs are necessary for a generalist? a specialist?

3. The most difficult task seemed to be reaching consensus on the group of PCs to be used in the study. Time limitations, space limitations and the limited numbers of personnel available as raters caused the greatest problems. At the beginning of the study only two full-time people were available. Through the generosity of new graduate students who volunteered their services during the study, a modicum of bottlenecks occurred and few people were burdened with long hours. Choices were made to include PC on the following basis:

a. Comprehensiveness - PCs covering a wide range of teaching and science skills were used, covering:

1. Pedagogy.
2. General skills
    a) safety
    b) chemistry
    c) instrument handling
3. Biology - classification, keying, etc.
4. Geology
5. Physical Sciences
    a) electricity
    b) density

b. PCs were chosen which utilized materials and settings readily available.
c. PCs were chosen for their objectivity and ease in being examined using available time and personnel. Some PCs yield themselves to objective, reliable data gathering.
d. For some PCs, numerous IAs could be developed. Such PCs were favored above those which yielded themselves to only one or two IAs.

4. Instructional alternatives alluded to when designing the PCs had to be prepared. These were of seven distinct types:

a. Classroom instruction - traditional, including laboratories and discussions.
b. Single concept videotapes - a 1/2" Sony videotape player was made available and students were shown its operation. Tapes were on individual 4" reels kept on a rack.
c. Single sheet - brief outline or summary of techniques required in performing some scientific skill. These were assumed to be useful as a refresher for people who have studied a technique in the past.
d. Talk to your friends - often a classmate can show you how to do something.
e. Independent study - research it yourself or look it up in your old textbooks, etc.
f. Selected readings - A list of references was on reserve in a convenient place. This list was handed to all thirty-one students. Most readings were brief.
g. Programmed instruction - a programmed text was developed to be used for the PCs involving electricity.

5. Administration of the program. Figure 1 shows the calendar of events. Students were given the PC list and were told to examine it and choose IA's. The IA's available are coded on the left of each PC. The students returned these lists indicating their IA preferences and we examined the lists to determine whether:

a. bottlenecks occurred on any particular IA because too many students chose a particular one.
b. any IAs were being neglected and would not produce evaluative data.

After examination of the lists, about ten per cent of the IA requests were turned down and on the average, each student was requested to take about three IA's other than those he first chose. This action was taken to overcome problems mentioned in a and b above.

6. The PC lists mentioned above were returned to the students and our changes were explained. The facility where the students could tinker with apparatus, practice and test out on PCs was manned by one or two assistants. When ready, the student would ask to be examined and the

assistant would administer the test. When the student passed, the assistant would initial the number of that PC on the list. This would serve as a guide to the student, showing which PCs he had completed and also would act as a receipt the student could keep to prove he had completed the PC. After the student had completely filled out the evaluation form (Appendix B), the evaluator initialed it, indicating that the student had passed that PC, and then added the form to a folder kept on that student.

7. At the completion of the program the student folders were examined to determine if all the students had completed all the PCs. Most students had and they were given a passing grade.

8. Data gathering.

   a. While the evaluation forms were still in each student's folder, holes were punched in all the forms in order to code the following information for later correlations with other data such as previous educational background.

      1.) Background in college
         a) regular science courses
         b) regular science courses plus a biology course
         c) regular science courses plus a physical science course
         d) regular science courses plus an earth science course
         e) b and d above
         f) c and d above

   b. The evaluation forms were then read and tabulated. Retabulations were then simplified, summarized, and insignificant data were weeded out. Final tabulations were then made to describe as much about the PCs as possible (Appendix A), and to describe as much about the IAs as possible (Appendix C).

Description of study as performed including brief outline of events. The study was carried out exactly as described above, The study was administered by Dr. Richard D. Konicek, coordinated by doctoral student Peter Utz, assisted by doctoral students Michael Burton, Carl Hoagland, Barry Kaufmann and Stephen Waite.

Student population: Because of the paucity of help and the nature of the performances, it was decided to limit the population to thirty-one randomly selected students. The students were chosen from a population of approximately 120 senior elementary education majors. All students except one were to begin student teaching at the culmination of the methods and curriculum courses which comprised the first half of the semester. The study occurred during the month of October, 1969. There were twenty days of study and work by students and nine full days set aside for the testing of criteria.

The population included three men and twenty-eight women, a typical ratio at the University in elementary education.

The background of all students was quite similar in that all had satisfied University core requirements in English, sociology, language science and mathematics. In science, however, various electives were taken above the requirements of zoology, botany (one semester each), Zoology 200 (Natural History) - a course which stresses ecology, astronomy, geology and field studies. All of our group were also involved in the Language Arts study, while others were involved in three or four of the METEP feasibility studies at the same time.

Description of PC's and IA's tested.

PC 1: Given a student type question and age level you will have 3 days to find a reference and put answers into student terms (approximate age level).

Rationale: Students should be able to find information in a variety of places but a library is usually the first source available.

Evaluation: Evaluation was too dependent upon the values of the rater. The criterion was not specific enough. Further, it asked for two behaviors instead of one.

Suggestions: Limit criterion behavior to finding three pertinent references, possibly agreeing with a prescribed book list for raters.

IA's: Class, talk to friends, independent study, selected readings. Class was held by the librarian who pointed out new and useful resources where one would not normally look.

Suggestions: Provide references given by librarian, annote and use as selected reading.

PC 2: Given an elementary text you will change a closed activity into an open-ended activity.

Rationale: Texts are full of closed activities. Students should be able to turn the inadequacies of a text into viable activities.

Evaluation: Eight of thirty pretested out. Most students felt it was valuable - only one thought it was poor.

Suggestions: No major change seems necessary.

IA's: Class, talk to friends, independent study, selected readings. Class was typical discussion with teacher as facilitator. Handouts were given in simulated activities.

Suggestions: No change intended.

PC 3: Given a phenomenon or topic you will write two problems for open-ended activity for students at an appropriate level.

Rationale: Next level above PC 2 in which students must initiate the activity rather than change a given activity. It should be

Figure 1

Total Calendar of Events

June		Make videotapes for IAs. Develop and select PCs to be used in the study.
July		
August		Order equipment
September	1	
	5	
	10	Prepare programmed text. Print up all handouts
	15	Get other IAs ready.
	20	
	25	Buy more equipment locally.
	30	
October	1	Run feasibility study.
	5	
	10	
	15	
	20	
	25	
	30	Examine student folders.
November	1	
	5	
	10	Tally data.
	15	
	20	
	25	Write Phase II report.
	30	

valuable to teachers in initiating curricula.

Evaluation: All students rated this PC as excellent and good.

Suggestions: We need a better rating system to determine pass and fail qualities. Possible "openness" and "closedness" scale would be of value.

IA's: Class, talk to friends, independent study, selected readings. Selected readings were rated excellent, class only moderately helpful.

Suggestions: A better method of teaching this criterion might be beneficial along with a better rating scale.

PC 4: Given a question such as "Do things that make sounds vibrate?" you will rewrite the question to make it open-ended. (e.g., "What do you notice about things that make sounds?"

Rationale: Teachers tend to ask questions which lead to simple, one word answers. This was to make teachers aware of other ways of asking the same questions, allowing for broader answers.

Evaluation: Students were asked to change four questions. Seventeen were able to pretest with only an example as a model.

Suggestions: Delve more deeply into Bloom's Taxonomy of Instructional Objectives.

IA's: Class, talk to friends, independent study, selected readings. Class rated as extremely and moderately helpful.

Suggestions: Class should be more inclusive with behavioral opportunities to actually write questions to a greater extent. Maintain the criterion as beneficial.

PC 5: You will provide the examiner with a presentation on each of two topics which could be used to open an inquiry centered lesson.

Evaluation: All students rated this PC as excellent to good - no poor ratings. Our ratings showed that our expectations were higher than actual performance in areas of creative events.

Suggestions: An activity allowing more creativity in selecting events should be designed and rating scale included.

IA's: Class talk to friends, independent study, selected readings.

Suggestions: Students would like to try events on children.

PC 6: Given a list of 20 questions you will be able to classify them as either divergent or convergent or convergent questions at an 80% level.

Rationale: Same as PC 5.

Evaluation: Rated as good and excellent in value.

Suggestions: none

IA's: Class, talk to friends, independent study, selected readings.

Suggestions: class or IAs should include more practice.

PC 7: Compare two NSF sponsored curriculum programs.

Rationale: New programs are reaching a point of availability. Students should know their availability, cost, philosophies and goals. These students will then become change agents or at least sources of information.

Evaluation: Favorable reactions - 99% excellent. This was an experiential criterion.

Suggestions: More time needs to be spent in play and perusal of material.

IA's: Class, talk to friends, independent study, selected readings.

Suggestions: none.

PC 8: You will participate in a small group discussion on the topic of student involvement in science learning.

Rationale: Students seem to need time to talk about their feelings concerning student involvement.

Evaluation: Many students seem to change their minds about involvement lessons when confronted with different opinions.

Suggestions: Provide more time for small group discussion on other topics.

IA's: class.

PC 9: You will take a test of exemplary type on a topic in science.

Rationale: Students should have the opportunity to take a test of exemplary type - not just talk about one.

Evaluation: Student evaluation was 99% excellent. We would like to include tests of more types.

Suggestions: Include tests of more types.

IA's: Class.

Suggestions: none

PC 10: You will have the experience of inquiry by engaging in play with one inquiry type program - following teacher's guide or class.

Rationale: Students should feel the excitement and enjoyment of this type of activity and should be allowed to succeed and move at their own rates.

Evaluation: Students rated this 98% excellent and 2% good. Feelings ran high on all of the above goals.

Suggestions: Continue as is with more opportunity.

IA's: class.

Suggestions: none.

PC 11: You will read a science periodical designed for children.

Rationale: Teachers should know potential of children's periodicals for classroom use.

Evaluation: Ratings were good to excellent. Students seemed happy to know of the existence of the periodicals.

Suggestions: Discussion or tape of uses of these periodicals should be available.

IA's: no specific - experimental.

Suggestions: none.

PC 12: You will read a science education periodical designed for teachers.

Rationale: Future teachers should be aware of periodicals available to them in the area of science.

Evaluation: Ratings were good to excellent.

Suggestions: Provide more different types of periodicals, some of which may only include sections on science teaching.

IA's: no specific - experimental.

Suggestions: none

PC 13: You will witness the use of an overhead projector in teaching a science lesson.

Rationale: If teachers teach as taught, they should be involved in a lesson using media.

Evaluation: 77% rated it as excellent, 13% good and 10% as poor. Many claimed to have participated in similar lessons previously.

Suggestions: Drop as a single PC and include in all types of lessons for other PC.

IA's: Class

Suggestions: none.

PC 14: You will participate in a laboratory lesson for designing and building equipment using inexpensive materials.

Rationale: Teachers should not rely entirely upon purchased equipment. They should be able to create materials from everyday objects.

Evaluation: Twenty-five out of twenty-six rated it as excellent, one as good. The activity seemed to be very popular.

Suggestions: Continue with more emphasis on creative use of cheap materials.

IA's: Class.

Suggestions: none.

PC 15: Given a grain specimen you will plant, then build a log of information and draw conclusions wherever applicable from the data log sheets provided.

Rationale: The study was mainly interested in whether students could keep a log of observations without being given a format.

Evaluation: For the most part, we find that students are highly dependent upon a structure for observation. Three students turned in observations which included other than standard measurements.

Suggestions: Provide a situation where creative and wide-open observations are required - try to remove the idea of presenting observations for the teacher and more for oneself.

IA's: Talk to friends, independent study, selected readings.

Suggestions: none.

PC 16: Given a specimen, a microscope, and a plastic transparent metric ruler you will calculate the size of the specimen within 10%. (passing this one will credit you with passing #17 and 18).

Rationale: Students should have some idea of size of objects under scope so that idea and skill can be transmitted to children.

Evaluation: Most considered this good to excellent (80%) while 20% rated it poor. The latter respondents saw no use for it.

Suggestions: Provide more rationale to students. We are surprised that more could not pass this on pretest after have three biology courses.

IA's: Class, single sheet, talk to friends, independent study. Class was a lab in which students were allowed to familiarize themselves with the microscope and then to concentrate on the estimation skills. Class used overhead projector to show techniques.

Suggestions: Improve single sheet and possibly eliminate class.

PC 17: Calibrate microscope's field of vision.

Rationale: Students should have some idea of size of object under scope so that this idea and skill can be transmitted to children.

Evaluation: Most rated this PC as poor. Again there seemed to be a feeling that this was of little value in elementary school. Students may under-estimate the need for such skill due to their experience during their elementary schooling.

Suggestions: Make clear the reason for the criterion. Provide evidence of its need.

IA's:Class, single sheet, talk to friends, independent study. Class was a lab in which students were allowed to familiarize themselves with the microscope and then to concentrate on estimation skills. The class used an overhead projector to show techniques.

Suggestions: none

PC 18: Given a microscope you will place a slide on the stage and focus on a selected section of the specimen on low and then high power.

Rationale: Students should have a secure working knowledge and skill in use of the microscope.

Evaluation: All students rated this PC good to excellent. Many did not pass this PC per se, preferring instead to pass numbers 16 and 17 which automatically passed number 18.

Suggestions: none.

IA's: Class, talk to friends, independent study, selected readings.

Suggestions: Programmed material would probably suffice for this small segment of the population.

PC 19: Given a wire with insulation and wire strippers you will submit a wire stripped of its insulation.

Rationale: This is a skill valuable to those working with electricity and involved in connecting wires.

Evaluation: The students rated this PC to be of value to them as teachers. Many students could do the PC without an IA. The PC was perhaps too easy and simple. The PC lended itself to a quick and objective teaching procedure.

Suggestions: This PC should be a subpart of a hierarchal structure of PC's in electricity. It would be better if this was a skill used in doing some terminal PC.

IA's: Class, videotape, talk to friends, selected readings. The class included a demonstration followed by guided practice.

Suggestions: Class, videotape and talk to friends seemed to be the best IA's.

PC 20: Given a burner and a glass tube you will successfully bend a piece of tubing. Successful completion will be determined by a bend in the glass tubing that contains no obstructions. (i.e., water passes freely through the tube).

Rationale: It is a necessary skill to be able to make 'custom' tubing arrangements inchemistry; what you want is often not available, ready-made.

Evaluation: Students rated the PC to be of good value to them as teachers. The PC was easy to do and easy to test.

Suggestions: none.

IA's: Tape, talk to friends, independent study, selected readings.

Suggestions: Most students chose videotape or talking to friends.

PC 21: Given acid and water you will demonstrate understanding by properly mixing the two.

Rationale: This is a necessary skill for anyone who wishes to use chemicals safely.

Evaluation: The students rated this PC as having good value to them as teachers. The evaluation was easy and the PC was easy to pass.

Suggestions: none.

IA's: Videotape, single sheet, talk to friends, independent study and selected readings.

PC 22: Given a small glass tube you will break it. Successful completion will be a break that is flat and that does not have cracks in any portion of the tubing.

Rationale: This is a necessary skill when working in chemistry.

Evaluation: The students considered the PC to be of value to them as teachers. The PC was easy to pass and easy to test.

Suggestions: none.

IA's: Videotape, talk to friends, independent study, selected readings.

Suggestions: Videotape was most popular as an IA.

PC 23: Given a newly cut glass tube you will fire polish a glass rod so that there are not any rough edges on the rod and so that water can flow through the opening.

Rationale: A necessary skill for anyone working in chemistry where one generally customizes one's own glass tubing.

Evaluation: Students considered this to be a valuable PC. It was easy to pass and test.

Suggestions: none.

IA's: Videotape, talk to friends, independent study and selected readings.

Suggestions: Videotape was the most popular IA and was a highly successful IA.

PC 24: Given a liquid that gives off a gas you will demonstrate the proper method of smelling a gas.

Rationale: Safety in the laboratory is a necessity. This PC shows the safest way to smell a gas without overwhelming yourself with the vapors.

Evaluation: Students considered the PC valuable. The PC was easy to pass and easy to test.

Suggestions: none.

IA's: Videotape, talk to friends, independent study, and single sheet.

Suggestions: All IA's except independent study were popular. Perhaps independent study was too inconvenient, as the references were two flights downstairs.

PC 25: Given a filter paper fold it so that a liquid can be filtered through it.

Rationale: Filtration is a common activity in chemistry. Folding the filterpapers so that they fit into the funnels is a necessary skill.

Evaluation: The students considered the PC valuable to them as teachers.

Suggestions: Perhaps a better PC would be to use a filter paper rather than to just fold it correctly. Also it would have been good to give the examinations privately so that other students would not see the technique examined.

IA's: Videotape, talk to friends, independent study.

Suggestions: Videotape and talking to friends were used widely and most successfully.

PC 26: Given two wires and a pair of pliers you will solder and submit two wires that are joined. The solder joint must hold the wires together and there should not be any cracks in the solder.

Rationale: This PC is a necessary skill for anyone who expects to do any "custom" electrical work for the science classroom. Often electrical things must be made for the classroom as they are not readily available.

Evaluation: Students considered the PC to be of good use to them as teachers. The PC was hard to test objectively.

Suggestions: The evaluators should practice judging solder joints to increase reliability between one and the next. Often one evaluator would accept a solder joint which another would reject.

IA's: Videotape, talk to friends, independent study, selected readings.

Suggestions: Most students favored videotape as an IA.

PC 27: Given a group of objects you will find three different classification systems for grouping the objects into two groups.

Rationale: So many new curricula emphasize processes. Classification, one of these processes, is seen in this criterion as being open-ended in its definition.

Evaluation: Twenty students pretested out. Rating the criterion, one student thought it excellent, 25 good and 2 poor.

Suggestions: Again, a reason for the criterion seems in order. Students seem to find this an easy criterion to pass although the concept is one which they are not familiar with at this level.

IA's: Class, talk to friends, independent study. Very little instruction of any kind was necessary - simple experience showing the validity of more than one system would suffice.

Suggestions: A program or a tape might present the material quickly and succinctly.

PC 28: Given a group of objects with labels (such as leaves, seeds) you will construct a dichotamous key with the minimum number of couplets.

Rationale: Terminal in classification criteria. A student who can construct a key is at the highest level of understanding in classification process.

Evaluation: Ratings showed one excellent, twenty good and three poor. Students were asked to prepare a key using given objects and their properties. Three students could not see the value of such knowledge. 50% of the students pretested out.

Suggestions: Providing the rationale for the criterion before testing should improve the reaction of students.

IA's: Class, talk to friends, independent study. Class was popular and was rated good or excellent by all participants. Practice and reinforcement through feed-back was deemed necessary by students.

Suggestions: none.

PC 29: Given a key to various objects you will successfully identify all objects through use of the key.

Rationale: Children are constantly asking for help in identification. Use of keys is a valuable asset.

Evaluation: The students considered the PC to be of some value to them although it was a review for most. Twenty-one passed the pretest.

Suggestions: Few need help in this criterion.

IA's: Class, talk to friends, independent study, selected readings.

Suggestions: Few needed more than a quick review. It seems unlikely that this will be needed for more than review purposes.

PC 30: Given wire, compass, dry cell you will submit a galvanometer that functions properly.

Rationale: Some simple electronic equipment is easily made. The students are not only shown how to make a piece of equipment, but they are encouraged to think creatively about constructing their own equipment in the future.

Evaluation: The students considered the PC to be of limited value to them.

Suggestions: Perhaps more emphasis should have been placed on why the galvanometer works rather than how to build one.

IA's: Videotape, talk to friends, selected readings and independent study.

PC 31: Given a voltmeter 1 1/2 volt dry cell, wire, parallel and series circuit configurations and 1 1/2 volt lamps, you will measure the voltage drop across one lamp connected in a parrallel circuit consisting of 3 lamps. (passing this credits you with passing #32 also).

Rational: In order to work with electricity oneneeds to know the differences between parallel and series circuits; one needs to know how to measure voltage drops and observe relationships between voltages and circuit configuration.

Evaluation: The PC was considered to be of considerable worth to teachers. The PC was easy to test out.

Suggestions: A 1 1/2 volt battery hardly lights three bulbs in series and dimly lights bulbs in parallel. Next time we should have a 3 volt battery for more dramatic affects.

IA's: Class, single sheet, talk to friends, independent study and programmed instruction.

Suggestions: Most people were afraid they knew too little about electricity to even pass the PC. Therefore they took no chances and elected class as their IA. Only a few students elected other IA's. Some students were asked to take an IA other than class. Those students who took a different IA at our request passed the PC as easily as those who took class as their IA.

PC 32: Given a voltmeter, 1 1/2 volt dry cell, wire, parallel and series circuit configuration, and volt lamps you will measure the voltage drop across one lamp connected in a parallel circuit consisting of two lamps.

Rationale: The rationale is the same as for PC 31. However, this PC is easier since the circuit is not as complicated as in PC 31. Anyone who could not do PC 31 might do this PC.

Evaluation: Once the students discovered that PC 31 was terminal and that doing that one exempted them from this one they all tested out on 31 and totally neglected this one.

Suggestions: Cancel this PC and use the terminal PC 31.

IA's: Class, single sheet, talk to friends, independent study, programmed instruction.

Suggestions: The programmed instruction booklet was written by one of the assistants on the project. Some of the students did well with it; others had diffficulty with the sumbolic notation. Photographs rather than diagrams may have improved the booklet, or perhaps just simpler diagrams. Most students elected class as the 'safest' IA.

PC 33: Given a voltmeter, 1 1/2 dry cell, wire, parallel and series circuit configurations, and 1 1/2 volt lamps you will measure the voltage drop across one lamp connected in a series circuit consisting of three lamps. (passing this credits you with passing 34 also).

Rationale: In order to work with electricity one must know the relationship between voltages and circuit configurations, recognize parallel and series circuits and measure voltage drops.

Evaluation: The students considered the PC to be of average value to them.

Suggestions: Many students complained that they could pass the PC but they did not understand why things happened the way they did. It would be good to include more PC's inculcating understanding rather than just skills..

IA's: Class, single sheet, talk to friends, independent study, and programmed instruction.

Suggestions: Lack of confidence was the reason why so many students elected to use the class IA. Many required a detailed learning experience which the other IA's did not always give. Some chose class because they wanted to ask questions.

PC 34: Given a voltmeter, 1 1/2 volt dry cell, wire, parallel and series circuit configurations, and 1 1/2 volt lamps you will measure the voltage drop across one lamp connected in a series circuit consisting of 2 lamps.

Rationale: The rationale is the same as with PC 33 but this PC is easier with a simpler circuit. It was hoped that those who could not do PC 33 would do this PC and then use an IA to get through PC 33.

Evaluation: No one chose to take this PC. They all elected to try the terminal PC 33.

Suggestion: Cancel this PC.

IA's: Class, single sheet, talk to friends, independent study, and programmed instruction.

Suggestions: Same as for PC 33.

PC 35: Given an ammeter you will measure current flow in a circuit.

Rationale: When working with electricity one needs to know how to make this measurement.

Evaluation: Students thought this to be a good PC. It definitely separated those students who knew the differences between the operation of a voltmeter and an ammeter from those who didn't.

Suggestions: none.

IA's: Class, single sheet, talk to friends, independent study, programmed instruction, selected readings.

Suggestions: Class instruction was f vored by those who felt incompetent around electrical items. Those who felt more comfortable by this time with electricity chose single sheet as their IA.

PC 36: You will make 8 out of 10 predictions correctly with respect to parallel and series circuits, lights, and batteries.

Rationale: This PC was included with the other PCs in electricity to insure that the students understood what kinds of circuits did what. The other PCs in electricity dealt only with skills of connecting circuits.

Evaluation: Those who passed in an evaluation sheet on this PC said it was vital to them as teachers. This was a paper and pencil test with ten questions.

Suggestions: none.

IA's: Single sheet, talk to friends, independent study, programmed instruction and selected readings.

Suggestions: Videotape and single sheet were the most popular IAs.

PC 37: Given three different minerals, order them according to hardness.

Rationale: This PC was included in order to make our finding generalizable to the area of geology. Although other PCs could have been applied to geology this one was easy to test out objectively.

Evaluation: The PC was deemed to be of average value to them as teachers.

Suggestions: Test the PC in private so that other students don't see the technique you're testing for. Also, acquire large numbers of minerals of differing hardness because once a mineral is scratched it is difficult to test for hardness a second time.

IA's: Videotape, talk to friends, independent study, selected readings.

Suggestions: Videotape was very successful.

PC 38: Given a liquid, a container and a scale and a graduated cylinder you will calculate the density of the liquid. (passing this and #44 credit you with passing #39, 41, 42, 43 also).

Rationale: Density is a major basis concept in science. PC 38 through 44 form a hierarchy of items, some of which are difficult and terminal (PCs 38 and 44), some of which are intermediary (PCs 39-43).

Evaluation: The students thought the PC was of excellent value to them. The examination was difficult and many had trouble reading the exact amount of liquid in their graduated cylinders.

Suggestions: none.

IA's: Class, videotape, talk to friends, independent study, selected readings.

Suggestions: Most students did not feel knowledgeable in the area of density and elected class as the "safest" IA. As a second choice, students chose videotape as an IA. Videotape and class covered PCs 38 through 44 in one sweep.

PC 39: You will state how the density of an object could be measured and apply the measurements in determining the density of a solid given its volume and mass.

Rationale: Density is a major basis concept in science. PCs 38 through 44 form a hierarchy of items, some of which are difficult and terminal (PCs 38 and 44), some of which are intermediary (PCs 39 and 43).

Evaluation: Everyone who thought they could do the calculations also thought they could make the measurements, so no one elected to do this PC.

Suggestions: There was not a single student who could not calculate density given mass and volume.

IA's: Class, talk to friends, independent study, selected readings. Videotape and class covered PCs 38 through 44.

Suggestions: Most students did not feel knowledgeable in the area of density and elected class as the "safest" IA.

PC 40: Given an irregularly shaped solid, you will calculate the volume of the solid by displacement.

Rationale: Density is a major basic concept in science. PCs 38 through 44 form a hierarchy of items, some of which are difficult and terminal (PCs 38 and 44), some of which are intermediary (PCs 39 - 43). This PC was for those who could measure volume but had difficulty finding density.

Evaluation: Only two people took this PC. They could not measure density, but they did know how to measure volume.

Suggestions: It is important to have this PC available for those who can measure volume but cannot apply the measurement to the more complicated task of finding density.

IA's: Class, videotape, talk to friends, independent study. Videotape and class covered PCs 38 through 44.

Suggestions: Most students did not feel knowledgeable in the area of density and elected class as the "safest" IA.

PC 41: You will weigh an object on a balance to an accuracy of 1%.

Rationale: Density is a major basic concept in science. PCs 38 through 44 form a hierarchy of items, some of which are difficult and terminal (PCs 38 and 44), some of which are intermediary, (PCs 39 - 43). For those who could weigh an object but not do the more complicated task of finding density, this PC was included.

Evaluation: Only one person needed this PC.

Suggestions: The PC is necessary for those who can weigh but not find density: however, demand for this PC is low because most students can weigh things with little difficulty.

IA's: Class, videotape, talk to friends, independent study. Besides a videotape covering how to find density, there was a videotape concerned with how to weigh things using a beam balance or pan balance.

Suggestions: none.

PC 42: Given a graduated cylinder and some liquid you will measure 57 cc of that liquid in the cylinder and present it for checking.

Rationale: Density is a major basic concept in science. PCs 38 through 44 form a hierarchy of items, some of which are difficult and terminal, (PCs 38 and 44), some of which are intermediary, (PCs 39-43). Some couldn't measure density; some couldn't measure volume of an object; so this PC was for those who at least knew how to measure volume of liquids.

Evaluation: Students considered the PV valuable.

Suggestions: It was hard to get the evaluators to agree on small differences in volume. One evaluator should be in charge of examining this PC.

IA's: Class, talk to friends, independent study, single sheet.

Suggestions: Most students did not feel knowledgeable in the area of density and elected class as the "safest" IA. The IA"s didn't seem detailed enough. People still couldn't read a miniscus. Individual tutorial help either by a friend or instructor appears the best way to teach reading a miniscus.

PC 43: Given a cup, a scale and some liquid you will weigh 30 gm of the liquid in the cup and present it in the cup.

Rationale: Density is a major basic concept in science. PC's 38 and 44 are difficult and terminal while easier intermediate PCs 39 through 43 cover individual activities related to finding density. This PC covered the act of weighing or tearing a substance in a container and subtracting the weight of the container.

Evaluation: Most students skipped this PC in favor of a terminal PC in density. Those who did the PC felt it was a valuable one.

Suggestions: Leave the PC in the hierarchy as it is.

IA's: Class, videotape, talk to friends, independent study. The videotape covered PCs 38 through 44.

Suggestions: Those students who felt incompetent with density measurements chose class as the "safest" IA. The videotape was their second choice. Those who used videotape felt it was just as informative as a class would have been.

PC 44: Given an irregularly shaped object you will calculate its density within 15%. (passing this and #38 will credit you with passing 38-44).

Rationale: Density is a major basic concept in science. PC 38 and 44 are difficult and terminal while easier intermediate PCs 39 through 43 covered individual activities related to finding density.

Evaluation: The students rated the PC as vital to them. Most students elected this PC because it was terminal and they wanted to skip the intermediate PCs.

Suggestions: The PC was quite tedious to test, taking ten minutes per person. It may be beneficial to equip the lab with plenty of hardware (balances, graduated cylinders) and station an evaluator on the density station alone.

IA's: Class, videotape, talk to friends, independent study. The videotape covered PCs 38 through 44.

Suggestions: Those students who felt incompetent with density measurements chose class as the "safest" IA. The videotape was their second choice. Those who used videotape felt it was just as informative as a class would have been.

Findings, Implications and Conclusions

Findings Pertaining to Performance Criteria. From an examination of the evaluation form (Appendix B) one can see that the qualitative data is quantified. Examination of Appendices A and C will show how students valued the PCs and IAs individually. Totals are listed below.

144 evaluation forms indicated the PCs were of excellent value to students.

196 evaluation forms indicated the PCs were of excellent value to teachers.

278 evaluation forms indicated the PCs were of good value to students.

374 evaluation forms indicated the PCs were of good value to teachers.

200 evaluation forms indicated the PCs were of poor value to students.

94 evaluation forms indicated the PCs were of poor value to teachers.

Results seem to indicate that the program was as quick and painless as possible. There were low failure rates and high pretest out rates. Results also show that about half of what we would have taught ordinarily was already known. Teaching it to all students would have been a partial waste of time. Results also lead us to believe that most students who think they already know something, do indeed know it. Only 3% thought they could already do a PC only to find out they really could not. 58% of the PCs were passed without the use of IAs (called pretesting out). 3% of the 424 pretesters failed the test. It took an average of 11 minutes to test each PC. 5% of the posttesters failed the test after taking an IA.

Findings Concerning Instructional Alternatives. Most students chose class as their first IA. Second choice was videotape when available. Next came talking to friends although it was always available. Least popular were the selected readings.

Those who attended class as an IA ended up spending approximately one hour for that IA. Those who chose other methods of instruction took less than one-half that time in general. The two quickest methods of instruction were videotape and single sheet, both taking an average of seven minutes.

Videotape as an IA resulted in a 10% failure rate as compared to class's 3% failure rate, indicating that class may be more thorough as an IA. The low failure rate of students who chose selected readings or individual study as their IAs is hard to interpret because those IAs were mostly used for PCs which were easier to pass. The more difficult PCs were taught using the most appropriate media possible - that was class, videotape and programmed instruction.

Few students thought any IA was useless. About half thought the IAs were moderately helpful and half thought the IAs were very helpful.

Appendices A and C give information about the success of each IA. From the data in these appendices one can compare the success and weaknesses of each IA individually. Some IAs were definitely more successful than others. IAs seem to be about 95% effective as teaching methods. As a total: 192 IAs were indicated as very helpful, 132 IAs were indicated as moderately helpful, and 13 IAs were indicated as useless.

Prevalent reasons for choosing an IA over other IAs were: looked like fun, interesting, convenient and looked easy.

Those who didn't take a particular IA indicated that for the most part they had no reason for rejecting it.

Those who elected to attend class often said they knew nothing about the subject of the PC and wanted a reliable, trustworthy method of learning the information.

Those who elected single sheet or videotape as their IAs most often suggested that they wanted a quick, concise way of getting the information.

Most of the students who failed a PC after using videotape as an IA went back to use the videotape again as a second IA and then passed the PC.

Conclusion: Concerning IA's and PC's. The PCs appear to be well chosen for a teacher training program. Most students seemed afraid to deviate from their traditional pattern of attending class. After the study began, however, more and more students began trying other IAs. Once they had tried them they elected to take them again when possible. Two hundred ninety-one times the students originally elected to attend class. In the end only 204 actually did. Of the 87 cases where students chose an IA other than the class they had signed up for originally, 35 did so without any encouragement from us. Most of the students who changed IA preferences during the program, changed to videotape, single sheet and talk with friends.

In future studies of this type the following things are likely to happen if things follow as they did in this study:

Most students will select class as the safest, most reliable method of learning. This is probable because class is what they are used to and trust.

As the program progresses, the students will witness occasional success at other IAs tried by either themselves or their friends.

The students will become more amenable to other IAs and in time will try them. They will discover that these IAs ,though sometimes riskier than class, are much faster.

As time goes on, students use other IAs more and more, finding them more convenient and less time consuming than class. As students become comfortable with other IAs they will choose an IA on its merits in a particular subject matter. For those PCs in which the student feels lost and helpless, the student will choose class as his IA. For those PCs in which the student feels comfortable the students will choose some faster IA. Some IAs are more convenient for a student than others at a particular time, so these IAs will be the ones he chooses.

Students will be most willing to pretest out of as many PCs as possible.

When a hierarchy of PCs is involved most students will be likely to head for the terminal PC and try to pass it. Only the very unsure students will take the intermediate steps.

In short, PCs and IAs allow for a maximum of student individuality. All that students who know something need do, is prove they know it. Students who do not feel secure can review quickly with the method of their choice. Those who are slow to grasp a subject may choose an IA which moves at their speed. Those who are not confident, once trying an IA may select PCs which are intermediate, and carefully and slowly work their way up to the terminal PC.

Appendix D tallies the student responses to a questionnaire at the end of the course indicating the students' satisfaction with the program. It indicates that the students were well satisfied with the program as a whole, that the PCs and IAs were suitable, that the students felt involved, interested and willing to participate again in the study.

One major problem lay in the lack of specificity in the pedagogical PCs. Much greater effort needs to be made in putting into these more specification for evaluation. Raters had some difficulty in agreeing upon pass-fail criteria.

The group feels that greater reliability might be reached by training the raters on specific aspects of the criteria performed and then attain reliability data before attempting another study of this sort.

Comparison of student course background with success in the pretests.

1. The students were broken into six groups on the basis of their prior experience in science courses.
   a. Group A - minimum courses
   b. Group B - minimum courses plus one biology course
   c. Group C - minimum courses plus one biology course and one earth science course
   d. Group D - minimum courses plus one physical science
   e. Group E - minimum courses plus one biology and one physical science
   f. Group F - minimum courses plus one biology and one physical science and one earth science

2. See Table 1 concerning student ability to pretest in the 16 - 44 performance criteria.

3. There seems to be no definite pattern toward higher pretest rates as students amass more credits in groups D - F because of their course work in physical science would be more likely to pretest in such PCs as 20 - 26 and 30- 44. No significant patterns seem to exist. In fact in PCs 38 and 44 a greater percentage passed in group A than in any other group and this is a minimum course group.

4. It is somewhat disappointing to find that only 19 of 31 students felt confident enough or actually had the ability to focus a microscope although they had all taken a minimum of three courses in biological sciences. There is always the possibility that they wanted to attack the terminal objective instead of the subordinate criteria.

5. Biology is normally thought of as working a great deal more than any other area with dichotomous keys. Note data on PCs 27 - 29. The group which seemed most consistently high on pretest was the minimum plus earth science group.

6. However, in PC #37, ordering minerals according to hardness, the highest percentage belongs to the minimum plus physical science group. Perhaps processes used there lead more to transfer use in a task such as this. Inferences can be made in many cases but data is not available to pursue them further.

TABLE 1

GROUPS AND NUMBER OF PEOPLE IN THEM

PC#	A(6)	B(5)	C(10)	D(7)	E(2)	F(1)	Total	PC Topics
16	2	2	3	1	0	0	8*	microscope - estab. object size
17	0	1	0	2	0	1	4*	microscope - calcu. of field
18	0	4	1	1	1	0	7*	microscope - focus
19	5	5	4	7	1	1	23	strip wire
20	4	2	2	6	0	1	15	bend glass tube
21	6	1	2	5	0	1	15	mix acid and water
22	3	3	3	6	2	1	18	cut glass tube
23	3	1	4	5	0	1	14	fire polish glass tube
24	5	1	6	4	1	1	18	smell gas
25	3	2	2	2	1	0	10	fold and use filter paper
26	0	0	0	2	1	1	4	solder wires
27	2	4	8	5	1	1	21	classify objects
28	1	2	7	3	1	0	14	construct key
29	2	2	8	7	1	1	21	use key
30	4	1	0	1	1	0	7	make galvanometer

TABLE 1 CONTINUED

PC#	A(6)	B(5)	C(10)	D(7)	E(2)	F(1)	Total	PC Topics
31	0	0	1	2	0	0	3	
32	0	0	1	0	0	0	1	measure voltage drop in various circuits
33	0	0	1	0	0	0	1	
34	0	0	1	0	0	0	1	
35	0	0	1	0	0	0	1	measure current flow
36	0	0	1	0	0	0	1	pass circuitry test
37	3	2	5	6	2	1	19	order minerals
38	4	0	1	2	0	0	7	density of liquid
44	3	1	1	2	1	0	8[!]	calculate density of irregularly shaped

*Since all those who passed #16 and #17 can be assumed able to pass #18, the total for #18 will be 19 and the total for #17 will be 12.

[!] There are no responses for #39 - #43 on pretest. Students attempted pretest only on terminal objectives. Apparently they used an "all or nothing" response.

7. An interesting situation developed on PC #15 involving planting seeds and keeping a log on observations. Almost all students were told to plant, observe and record interesting observations - nothing more. To their horror (and ours) they were not ready for such an assignment. They demanded a form to follow, questions to answer, the number of pages required, and how many columns of data were required. Three logs were received which differed in any way from the usual height versus time variety. These logs contained fascinating observations concerning:
   a. a droplet of water which formed on one plant and stayed there for two weeks in various forms.
   b. leaf growth patterns not noticed before.
   c. leaf shapes as the growth took place.

Implications for curriculum reform.

1. Perhaps the paucity of self-initiated interest in seeing is a sign of the destruction of initiative by our "please the teacher" type of education. Our "give the teacher what she wants and forget my own question" are possibly to blame for much of the situation mentioned above.

2. Because of this it would seem advisable to be cautious about developing a four-year curriculum based entirely on performance criteria. It would seem that performances which show creativity and an appreciation for divergence of opinion and action must be an integral part of such a curriculum.

3. It is a reasonable assumption that it is impossible to identify in terms of behavioral goals all of the educational outcomes which we would deem appropriate. The danger then lies in teaching for a limited number of objectives and ignoring the objectives which should always be emerging. Those objects which are not prespecified are not anticipated and therefore tend to die from lack of identification and an Atkin stresses. The richness of certain educational opportunities might be diminished because in every learning experience there are literally dozens of possible and actual outcomes. If the teacher (or learner) is focusing only on a few, he tends to ignore the others.[1] (parentheses remark authors).

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[1] J. Myron Atkin, "Looking Gift Horses in the Mouth", The Educational Forum, XXIV, No. 1, November, 1969, p. 16.

4. These paragraphs are only meant to be a word of caution in a time when behavioral outcomes are seen as a panacea. We believe that there is room in any curriculum for both those goals which are behaviorally measurable and those which are not prespecified and therefore not necessarily measurable in the strictest sense of the word.

Facilities, Equipment and Materials

Although the study used a population of only thirty-one, it is reasonable to believe that information gathered can be generalized for larger populations.

1. The program will certainly need a great deal of aid from the College of Arts and Sciences in preparation of materials for instructional alternatives and in personnel to act as raters of performance criteria.

2. Should the program be put into action, a great deal of space will be needed to carry out a full program. The space would be found in two places:
   a. In the College of Arts and Sciences
   b. In the School of Education
   c. Regardless, some new space must be found in order to implement such a program.

3. Since the crew of raters were only able to work on two days out of each week in the testing area the personnel problem was intensified. Had full-time raters been available during the entire week, ninety to a hundred students could easily have been accommodated.

4. Many more curriculum materials will be needed, see Appendix E. Kits from the major curriculum projects would be necessary, e.g., Science - A Process Approach - AAAS, The Science Curriculum Improvement Study, Conceptually Oriented Program for Elementary Science - COPES, Elementary Science Study - ESS from Educational Development Center, Inc., texts from major publishers, Minnemast materials and various manipulatory devices designed for elementary science - O.M.S.I., Science Kit, S.E.E. Games of all sorts would be a great asset.

5. Space for housing and manipulating these devices and materials is of prime importance. If independent study is to become more important, much more material should be available to the students. A storage problem results. At least 120 linear feet of shelf space for storage of curriculum materials is necessary. Shelves should be twenty-four inches deep. In addition, ten to twelve cabinets of "dime-store" type materials would be necessary for other aspects of the pedagogical program. Approximately $3,000 worth of materials would fill these cabinets.

6. Facilities for viewing videotapes and listening to audiotapes will be necessary.

7. Facilities for videotaping will be necessary. These facilities will be improved by having a small classroom area (with table and chairs) measuring at least eight feet by ten feet. This, of course, presupposes the need for a portable videotape recorder.

8. A full-time technician-graduate assistant would be of great help. This person could be trained to operate all equipment and keep it in operating shape.

9. A list of materials can be found in Appendix E.

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APPENDIX A

DATA GATHERED ABOUT EACH PC

1	2	3	4	5	6	7	8	9	10	11	12
PC number	Number pretesting out	Number failing pretest	Time in minutes needed to administer test	VALUE TO YOU as a						Number of evaluation forms submitted by 30 interns	Check means and evaluation form required
				Student			Teacher				
				Excel	Good	Poor	Excel	Good	Poor		
1	12	0	40	1	6	12	2	9	6	19	x
2	8	0	33	3	7	3	6	8	1	15	x
3	8	0	30	2	6	2	4	3	0	12	x
4	17	0	7	3	13	4	3	19	1	22	x
5	2	0	30	2	7	3	10	12	0	22	x
6	15	0	7	0	13	7	2	21	1	24	x
7	0	0	45	1	13	2	6	15	0	21	x
8	4	0	15	7	2	0	10	0	0	12	x
9	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	11	6	4	11	6	4	27	-
12	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	8	1	1	8	1	1	-	-
14	-	-	15	18	1	0	25	1	0	30	-
15	data bad --										x
16	7	1	8	8	6	4	8	6	4	24	x
17	4	0	3	0	2	3	0	4	1	6	-
18	7	0	5	3	3	1	4	3	0	7	-
19	23	0	3	0	19	6	0	25	4	29	x

APPENDIX A--Continued

1	2	3	4	5	6	7	8	9	10	11	12
PC number	Number pretesting out	Number failing pretest	Time in minutes needed to administer test	VALUE TO YOU as a						Number of evaluation forms submitted by 30 interns	Check means an evaluation form required
				Student			Teacher				
				Excel	Good	Poor	Excel	Good	Poor		
20	20	1	4	1	12	16	4	22	3	30	x
21	16	0	2	6	9	10	7	15	4	27	x
22	16	0	3	0	11	11	1	14	10	26	x
23	14	0	4	7	5	4	11	9	2	26	x
24	22	0	1	5	13	7	8	17	1	28	x
25	18	2	1	0	6	13	2	13	9	26	x
26	5	0	5	14	11	9	6	14	5	28	x
27	20	0	5	0	15	18	1	25	2	26	x
28	14	0	4	1	15	7	1	20	3	28	x
29	21	1	4	7	13	6	10	13	4	29	x
30	7	0	4	0	13	11	0	13	11	25	x
31	1	0	9	2	10	9	6	12	3	27	x
32	-	-	-	-	-	-	-	-	-	-	-
33	28	0	9	3	8	4	3	8	4	29	x
34	-	-	-	-	-	-	-	-	-	-	-
35	1	0	8	2	14	7	2	20	3	27	x
36	3	0	6	4	0	0	4	0	0	16	x
37	21	4	4	0	8	13	2	16	5	27	x
38	8	2	11	11	2	0	11	2	0	13	x
39	-	-	-	-	-	-	-	-	-	-	-

APPENDIX A--Continued

1	2	3	4	5	6	7	8	9	10	11	12
PC number	Number pretesting out	Number failing pretest	Time in minutes needed to administer test	VALUE TO YOU as a						Number of evaluation forms submitted by 30 interns	Check means an evaluation form required
				Student			Teacher				
				Excel	Good	Poor	Excel	Good	Poor		
40	1	1	9	-	-	-	-	-	-	2	-
41	4	0	-	-	-	-	-	-	-	1	-
42	6	0	3	3	0	0	3	0	0	4	-
43	3	0	1	1	0	1	2	0	1	3	-
44	8	1	10	10	8	2	13	8	1	26	x
Totals				144	278	200	196	374	94		

APPENDIX B

METEP - Science Name ____________________

Evaluation Form

Performance Criterion Number _____

1. __________________ Check here if you think you can already do the PC.

2. __________________ Initials of the evaluator who tested you and agreed that you can do the above.

3. Instructional alternatives (Use Key 1)

   ________ 1st choice

   ________ 2nd choice

   ________ 3rd choice

4. __________________ I chose this IA because it ... (See Key 2)

____

5. __________________ I crossed out this IA because it ... (See Key 2)

____

6. __________________ How long did it take you to do this IA?

7. __________________ What parts of the IA (readings, TV, lectures,

__________________ sheets) were most helpful to you?

____

8 __________________ What parts of the IA were least helpful to you?

____

9. Evaluate the IA in terms of its worth to you.

_____ Extremely helpful

_____ Moderately helpful

_____ Useless

Comments: ______________________________

____

10. ______________ Can you suggest an IA you might have preferred?

____

11. _____ Yes Did you pass the evaluation after doing your IA?

_____ No

12. ______________ How long did it take you to complete the

______________ evaluation (the criterion without counting the IA)?

13. ______________ IF YOU FAILED the evaluation after trying an IA,

which number IA did you try next? (See Key 1)

______________ What did you think of this IA?

____

14. ______________ IF YOU FAILED the evaluation a second time, then

which number IA did you try? (See Key 1)

______________ What did you think of THIS IA?

____

15. Evaluate the PC in terms of its worth to you as a student. ______

____

____

Evaluate the PC in terms of its worth to you as a teacher.______

____

____

16. Can you suggest a better PC in this general area? ____________

____

____

APPENDIX C

FINAL TALLY OF IA CHOICES

IA	Number of people who actually used this as their IA	Average time in minutes required to do this IA	Number of people who failed their PC after doing this IA	Percent of the people who failed their PC after doing this IA	How Helpful Was This IA To You		
					very	moderately	useless
Class	204	67	6	3%	70	62	2
Videotape	86	7	9	10%	43	21	3
Single sheet	23	7	1	4%	12	7	0
Talk to friends	74	17	4	5%	38	20	3
Indep. Study	35	23	0	0%	16	11	2
Selected Readings	16	18	0	0%	7	4	2
Programmed Instruct.	18	38	3	2%	6	7	1
Totals					192	132	13

APPENDIX D

METEP - Science
Final Evaluation

Name ______________________

Please list all science courses you have taken in college.

Indicate your rating by placing a mark in the appropriate box.

		Outstanding	Superior	Satisfactory	Unsatisfactory	Very poor
Part I						
1.	In general, how suitable were the IAs?	1	2	3	4	5
2.	How suitable were the PCs?	1	2	3	4	5
3.	How would you rate your involvement in this study? (SCIENCE ONLY!)	1	2	3	4	5
4.	Did you feel that an interest was taken in you as an individual?	1	2	3	4	5
5.	Would you participate in a second study-new content and new alternatives?	1	2	3	4	5
6.	What is your overall evaluation of the science study?	1	2	3	4	5

Part II

One way in which a student can improve METEP is through thoughtful student reactions. Please try to describe what you felt were the major strenghts and weaknesses of the science study. (Use back if necessary.)

Tally of Results

Question Number	Average Rating
1	2.4
2	2.8
3	2.8
4	2.2
5	4 - No, 27 - Yes
6	2.2

APPENDIX E

SCIENCE LAB - UNIVERSITY OF MASS

ITEM	QTY	DESCRIPTION	UNIT	TOTAL
1	2	Metal Utility Carts	30.00	60.00
2	3	Portable Science Tables	60.00	180.00
3	25	Carrels, Flexible Study Centers	75.00	1875.00
4	1	Human Torso, Actual Size		200.00
5	1 Series	Parade of Animal Kingdom		362.25
6	1 Series	World of Microscopic Life		200.55
7	1 Series	Walt Disney Nature Library		3549.00
8	5	Overhead Projectors	175.00	875.00
9	5	Record Player 300T	80.00	400.00
10	5	Tape Recorders, model 2520	169.00	845.00
11	5	Loop Projector 810Z	160.00	800.00
12	2	16mm Projectors 552T	635.00	1270.00
13	5	Screens, Radiant	38.00	190.00
14	1	Opaque Projector, Beseler VuLyte III		396.00
15	5	2 x 2 Slide Projector, Kodak 850QZ		995.00

SCIENCE LAB - Continued

ITEM	QTY	DESCRIPTION	UNIT	TOTAL
16	2	Filmstrip Projector, 745C	159.00	318.00
17	3	Overhead Projector tables	49.00	147.00
18	3	Sound Filmstrip Projectors DuKane Model 14A650A	225.00	675.00
19	12	Tape Cassettes, playbacks and records	80.00	960.00
20	5	Filmstrip Viewers, Standard Model 201	37.00	185.00
21		Supplies needed to equip lab not mentioned above		7107.40

TOTAL...............$ 21,590.20

MATHEMATICS

Introduction

Goals. The emerging programs in mathematics for grades K-6, have involved considerable changes from programs of a more traditional nature. All too often in the past, mathematics was presented as a series of seemingly unrelated facts and processes to be memorized. There has been a change in emphasis from learning via rote drill and memorization to developing an understanding of mathematics via direct involvement in meaningful activities. These activities give a student an opportunity to develop a visceral understanding and/or non-verbal awareness of the why of the topic under consideration before he is asked to conquer through memory, drill, or otherwise, the how of the topic being studied.

Programs which embrace the teaching of mathematics from this view point encourage the student to think for himself and to realize that most problems can be solved in a variety of ways. These programs plant early the seeds for understanding the structure of mathematics by many and varied concrete activities. As the student gains in understanding and becomes more mature in his thinking, topics are continually re-explored in greater depth and breath.

The teacher, as well as the curriculum itself, must be flexible enough to enable each student, whatever his level of ability, to achieve maximum growth and development based on his desire and potential to learn. The student in such a program learns by doing, by investigating patterns, by discovering for himself when possible, and by being caught up by the excitement of discovery of his peers. In essence, the program described presents mathematics as a vital, ever-expanding aesthetic experience, highly structured yet fostering the development of student imagination and creativity.

A school of education whose concern is the preparation of teachers to implement or perpetuate this type of curriculum must itself be committed to a program which emulates the objectives of the former. The program should enable the pre-service teacher to understand the language, concepts, and structure of mathematics necessary to effectively handle the existing curriculum and to be able to cope with changes which must occur as the curriculum evolves to keep abreast of the needs and demands of an increasingly complex society. It must also enable him to develop a sufficiency of pedagogically sound techniques and practical applications from which to generate interesting and relevant experiences for students. Finally, the program must develop in the pre-service teacher a competence, confidence, and creativity in mathematics education which will enable him to become an effective change agent in the public school environment.

In trying to meet these broad objectives, the mathematics component of METEP has been designed to incorporate three basic sections. These three sections consist of: 1) the content section; 2) the pedagogy section; 3) the expressive experience section. The content section and the pedagogy section each incorporate performance criteria and various instructional alternatives for meeting them. The expressive experience section involves the pre-service teacher in exploration of mathematical concepts via employment of materials developed by various mathematics project centers and mathematics educators.

A person successfully completing all three sections would have demonstrated acceptable achievement roughly equivalent to seven to nine semester hours of credit as traditionally defined, with four to six of these hours of credit earned in the content section.

Desired Outcome. This feasibility study attempted to consider the feasibility of learning selected performance criteria of the mathematics component of METEP by each of four instructional alternatives, namely:

1. Class-Participation Mode of Instruction
2. Semi-Automatic Audio-Visual Mode of Instruction
3. Written-Program-Instruction Mode of Instruction
4. Standard-Textbook Mode of Instruction.

For purposes of this feasibility study, these modes were defined as follows:

Class Participation Mode of Instruction (Class Mode)

> This mode of instruction consists of class interaction with content as presented by an instructor. All of the content which each student is required to learn is considered in detail with appropriate explorations, visual and/or oral illustrations, and examples for the students to work on in class. Active class participation is encouraged and there is ample opportunity for student questions and student initiated discussions. Each student is given a standard textbook which covers the same content considered in this mode of instruction.

Semi-Automatic Audio-Visual Mode of Instruction (A-V Mode)

> This mode of instruction consists of individual interaction with content as presented in an independent-study carrel equipped with a semi-automatic audiovisual instruction system. All of the content for which each student is responsible

to learn is considered in detail with appropriate explorations, visual and/or oral illustrations, and examples for the students to work on during contact with the system. Each student is also given a standard textbook covering the same content considered in this mode of instruction.

Written-Program Mode of Instruction (Written-Program Mode)

This mode of instruction consists of individual interaction with content as presented in a written-program instruction format. All of the content which each student is expected to learn is considered in detail with appropriate explorations, visual illustrations, and examples for the student to work on during contact with the material. Each student is also given a standard textbook covering the same content considered in this mode of instruction.

Standard-Textbook Mode of Instruction (Text Mode)

This mode of instruction consists of individual interaction with content as presented with a standard-textbook format. All of the content which the student is expected to learn is considered in detail with appropriate explorations, visual illustrations and examples for the student to work on during contact with the material. No other mode of instruction is available to the student.

Specific questions considered during the feasibility study included the following:

1. Can students learn to achieve the selected criteria by each of the instructional alternatives developed for the study?

2. Does student achievement differ significantly according to the instructional alternative experienced?

3. Does the variable of selection, free choice versus no choice, of instructional alternative significantly affect student achievement?

4. Do differences in aptitude on verbal reasoning, numerical reasoning, abstract thinking, and space relations significantly affect the student achievement?

5. Can aptitude scores be used to select the most appropriate instructional alternative for a student to facilitate maximum achievement?

6. Do differences in the number of years of college preparatory mathematics in high school, and the number of semester hours of courses in mathematics in college significantly affect student achievement?

7. What is the pre-study attitude of the students toward each of the four instructional alternatives?

8. What is the post-study attitude of the same students toward each of the four instructional alternatives?

9. Can participation in a given mode of instruction significantly change a student's attitude toward that mode of instruction?

10. What is the mean amount of time spent by each student in the instructional alternative available to him?

11. What is the mean amount of time spent by each student utilizing the text provided for the study?

12. What is the mean estimate by the students of the work load for the module?

13. What is a realistic ratio of students per carrel for the A-V Mode in terms of maximum availability and minimum waiting time?

Design and Implementation

Population and Sample. The population included in the feasibility study was the group of students, approximately one hundred thirty, enrolled at the University of Massachusetts in the course Ed 263, Principles and Methods in Teaching Elementary Mathematics. This population of students normally consists entirely of undergraduate seniors who are preparing to become elementary school teachers. Many will have taken one, two, or more courses in mathematics during their undergraduate program, and a few will have had no course work in mathematics during college. Ninety-six students were selected completely at random from the above group for the sample of subjects for the feasibility study.

Design. On Monday, September 15, all ninety-six subjects were given the Differential Aptitude Test (DAT) on space relations and abstract thinking. Measuremants on the aptitudes verbal reasoning and numerical reasoning were obtained from their College Examination Entrance Board (CEEB) Scholastic Aptitude Test (SAT).

On Friday, September 26, the ninety-six subjects in the sample were given a semantic-differential attitude test (Appendix A) on the four instructional alternatives to be utilized during the study. They were then given a forty-minute pre-test (Appendix B) of METEP Module Number 02030132, Numerations Systems for the System of Whole Numbers.

On Monday, September 29, the ninety-six subjects of the sample were partitioned completely at random into five groups, designated as A, B, C, D, and E. Groups A,B, C, and D, each contained twelve subjects and group E contained forty-eight subjects.

The corrected pre-tests were then returned to the subjects and they were told that in one week hence, they would take a different form of the same pre-test. The content of the original pre-test was not discussed with the subjects. However, each of the pre-test items had been written to measure student behavior as explicitly stated in a unique performance criterion of the module to be considered in the feasibility study. Each of these pre-test items had been keyed for easy identification with its corresponding performance criterion. Each subject was given a listing (Appendix C) of the performance criteria for the module at the same time he received his corrected pre-test.

Each of the subjects was then given a copy of the commercially prepared textbook covering the same material as that considered in the performance criteria module.[1] Each student was then asked to study the content indicated in the performance criteria for those test items answered incorrectly on the pre-test. Aside from being able to utilize the textbook just received, each student was asked not to solicit or accept any other form of instruction or help except from members of his his own group and the instructional alternative available to that group. Each student was also asked to keep an accurate record of the amount of time spent: 1) studying directly, alone or with others of the group, with the commercially prepared textbook; and 2) utilizing, alone with others of the group, the instructional alternative available to that group.

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[1] National Council of Teachers of Mathematics. Numeration Systems for Whole Numbers. Washington: National Council of Teachers of Mathematics, 1964.

The twelve members of group A were assigned to the Class Mode of instruction as their instructional alternative. This mode of instruction was to consist of class interaction with the content of the module as presented by the instructor of the class. All of the content which each student was expected to learn would be considered in detail with appropriate explorations, visual and/or oral illustrations, and examples for the students to work on in class. Active class participation would be encouraged and there would be ample opportunity for student questions and student initiated discussions. As were all students in the feasibility study, each student in this mode was given a standard textbook which covered the same content considered in the module. The Class Mode group was then scheduled for two seventy-five minute sessions during the normal meeting time for Ed. 263, namely Wednesday, October 1, and Friday, October 3.[2]

The twelve members of group B were assigned to the A-V Mode as their instructional alternative. They would have available to them five independent-study carrels, each equipped with a cassette-tape player and slide projector integrated into a semi-automatic audio-visual instruction system. Each system was programmed to cover the same material as presented in the Class Mode. The only basic difference between the two modes of instruction being that students in the Class Mode would have direct and immediate access to the instructor to raise questions and get student-instructor class interaction on the material under consideration. The carrels were located in the School of Education Library and would be available for use by members of the group during regularly scheduled library hours.[3]

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[2] The lessons were developed and presented by William J. Masalski, Director of the Mathematics Component of METEP who during his lessons made extensive use of the overhead projector and visuals prepared by him.

[3] The A-V program utilized was developed by William J. Masalski, Director of the Mathematics Component of METEP.

The twelve members of group C were assigned to the Written-Program Mode as their instructional alternative. They would have available to them copies of a commercially prepared programmed-instruction text containing the same material covered in the module.[4] The texts were located in the reserve section of the School of Education Library and would be available for use in the Library during regularly scheduled library hours.

The twelve members of group D did not have any instructional alternative available to them other than the text given to all ninety-six subjects in the study.

Each member of group E was asked to make his own choice of instructional alternative immediately after hearing the complete description of each of the various opportunities available to him. Once he had made his decision, each member of group E was asked to abide by the regulations set for the group already assigned that particular instructional alternative.

After group E had partitioned itself into the sub-groups, Ea, Eb, Ec, and Ed, according to the desired instructional alternative of each of its members, groups E and Eb were given a short training session on the operation of the audio-visual equipment to be utilized in their mode of instruction.

On Monday, October 6, one full week after the return of the corrected pre-test, a different form (Appendix D) of the forty-minute pre-test was given as a post-test to all ninety-six subjects. Following this post-test of content, the same form of the semantic-differential attitude test which was utilized prior to the study was regiven. A questionnaire (Appendix E) was then given to each student to complete.

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[4] Donald D. Paige and Ian D. Beattle, Changing Bases, A Programmed Supplement. Boston: Prindle, Weber, and Schnidt, Inc., 1969.

Analysis of Data. In order to use appropriate statistical analysis techniques, many of the original questions were rephrased as null hypotheses, which were then tested using analysis of covariance or regression analysis.

The measures of content achievement were two forms of the same test (Appendix B and Appendix D), each developed specifically for the study.

The measure of pre-study and post-study attitudes on the four indicated modes of instruction was the semantic differential (Appendix A), developed specifically for the study.

The College Entrance Examination Board (CEEB) Scholastic Aptitude Test (SAT) was used to measure verbal and numerical reasoning aptitudes.

To measure abstract thinking and space relations, the Differential Aptitude Test (DAT) was used.

For other relevant data, a questionnaire (Appendix E) was developed specifically for the study.

Of primary concern in the feasibility study was the testing of the following null hypotheses:

1. There are no signigicant differences in student content achievement between the two levels of selection.
2. There are no significant differences in student content achievement among the four levels of treatment.

Table 1 illustrates the design, with n's indicated in each cell, used in the first analysis of the data.

The group of forty-eight students granted free choice of treatment partitioned themselves in such a way that the cell sizes ranged from four to thirty. The assumption of homogeneity of within cell variances was rejected ($p < .05$) by Cochran's test.[5] Because of this violation of ANOVA assumption, two separate one-way analyses were made, one in which the cells were collapsed over treatment, the other over selection, as illustrated in Table 2 and Table 3.

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[5] B.J.Winer, Statistical Principles in Experimental Design. New York: McGraw-Hill, 1962.

Description of Performance Criteria and Instructional Alternatives Tested

The module considered in this feasibility, METEP Module Number 02030132, Numeration Systems for the System of Whole Numbers, was estimated to have the approximate "work load roughly equivalent to that of a typical week of work in a three-semester-hour course. This did not include approximately three hours of additional time spent by the students in the feasibility study in taking the various pre-tests and post-tests, in receiving an orientation to the study, and in providing additional feedback on various components of the study.

The choice of the module for consideration during the feasibility study was based on several considerations. First, due to the nature of the expressive experience section of the mathematics component, it was decided that not much additional information with regard to the feasibility of the overall mathematics component would be obtained by inclusion of material from that section. Students in the past had already expressed a strong desire for a continuation of this "innovative" procedure as part of their methods course in mathematics at the University of Massachusetts.

Secondly, due to the similarity of the approaches to pedagogy of the mathematics component and several other components of the study, it was decided that the best contribution by the mathematics component to the feasibility study as a whole would come by the mathematics component placing emphasis on its content section. Doing the feasibility study on the content section also seemed a logical choice since that section represented about two-thirds of the total mathematics component and was already conveniently partitioned into performance criteria modules. By highly concentrating its efforts on a single module which was representative of all the modules in the content section, it was ascertained that generalization might be forthcoming which would be appropriate to the entire content section.

The particular module selected for the study comes quite early in the content sequence. The module also is typical of most of the modules with regard to the depth and breath of desired content coverage for a person interested in becoming a generalist in elementary education. Additional in depth study in mathematics is required for students wishing to become specialists in elementary mathematics education.

The particular instructional alternatives considered, although rather tightly defined for the present study, seemed to represent four basically different approaches to instruction and learning.

TABLE 1

FEASIBILITY STUDY DESIGN, WITH CELL FREQUENCIES INDICATED, FOR THE INDEPENDENT VARIABLES OF TREATMENT AND SELECTION AND THE DEPENDENT VARIABLE OF CONTENT ACHIEVEMENT

Selection	Treatment			
	A-V Mode	Class Mode	Text Mode	Written-Program Mode
Free Choice	7	7	30	4
No Choice	12	12	12	12

TABLE 2

FEASIBILITY STUDY DESIGN, WITH CELL FREQUENCIES INDICATED, FOR THE INDEPENDENT VARIABLE OF SELECTION AND THE DEPENDENT VARIABLE OF CONTENT ACHIEVEMENT

Selection	Cell Frequency
Free Choice	48
No Choice	48

TABLE 3

FEASIBILITY DESIGN, WITH CELL FREQUENCIES INDICATED, FOR THE INDEPENDENT VARIABLE OF TREATMENT AND THE DEPENDENT VARIABLE OF CONTENT ACHIEVEMENT

Treatment	Cell Frequency
A-V Mode	19
Class Mode	19
Text Mode	42
Written-Program Mode	16

In both designs, the cell variances were homogeneous according to Cochran's test, and an analysis of covariance was performed for each.

For each design, content pre-test scores were covaried. The cell post-test means, unadjusted and adjusted for the covariance and covariate means for the first analysis appear in Table 4. Results of the analysis of the covariance appear in Table 5.

TABLE 4

DATA FOR THE FEASIBILITY STUDY DESIGN INDICATED IN TABLE 2

Group	Mean of Covariate	Unadjusted Mean of Post-Test	Adjusted Mean of Post-Test
Free Choice	2.43750	11.35417	11.33021
No Choice	2.37500	10.79167	10.81563

TABLE 5

ANALYSIS OF COVARIANCE FOR THE DATA IN TABLE 4

Source of Variance	df	Mean Square	F	p
Between	1	6.35331	0.75192	$>.50$
Within	93	8.44945		

It can be seen that the null hypothesis was not rejected. That is, there were no significant differences in student achievement between the two levels of selection.

For the second analysis, in which the original cells were collapsed over selection, the cell post-test means and covariate means appear in Table 3. The results of the analysis of covariance appear in Table 7.

TABLE 6

DATA FOR THE FEASIBILITY DESIGN INDICATED IN TABLE 3

Group	Mean of Covariate	Unadjusted Mean of Post-test	Adjusted Mean of Post-test
A-V Mode	2.89471	12.63158	12.22304
Class Mode	1.85211	10.94737	11.30441
Text Mode	2.59524	11.02381	10.83310
Written-Program Mode	2.00000	9.50000	9.74220

TABLE 7

ANALYSIS OF COVARIANCE FOR THE DATA OF TABLE 6

Source of Variance	df	Mean Square	F	P
Between	3	18.66849	2.30774	$<.10$
Within	93	8.08952		

The null hypothesis was retained, although the F ratio obtained was close to being significant at the .05 level. Alternatively, there were no significant differences in student achievement among the four levels of treatment.

Next considered were the following null hypotheses:

1. There are no significant differences in student attitude toward the A-V Mode of Instruction among the four levels of treatment.
2. There are no significant differences in student attitude toward the A-V Mode of Instruction between the two levels of selection.
3. There are no significant differences in student attitude toward the Class Mode of Instruction among the four levels of treatment.
4. There are no significant differences in student attitude toward the Class Mode of Instruction between the two levels of selection.
5. There are no significant differences in student attitude toward the Written-Program Mode of Instruction among the four levels of treatment.
6. There are no significant differences in student attitude toward the Written-Program Mode of Instruction between the two levels of selection.
7. There are no significant differences in student attitude toward the Textbook Mode of Instruction among the four levels of treatment.
8. There are no significant differences in student attitude toward the Textbook Mode of Instruction between the two levels of selection.

For each of the analyses of data to test the above null hypotheses the design in Table 8 was used, with n's indicated in each cell.

TABLE 8

FEASIBILITY STUDY DESIGN, WITH CELL FREQUENCIES INDICATED, FOR THE INDEPENDENT VARIABLES OF TREATMENT AND SELECTION AND THE DEPENDENT VARIABLES OF ATTITUDE

Selection	Treatment			
	A-V Mode	Class Mode	Text Mode	Written-Program Mode
Free Choice	7	7	30	4
No Choice	12	12	12	12

For the designs concerned with attitude toward the Class Mode and Written-Program Mode, the assumption of homogeneity of within cell variances was rejected ($p < .05$) by Cochran's test. For the other two designs, with data on attitude toward the Text Mode and the A-V Mode, the cell variances were judged to be homogeneous by Cochran's test, and analyses of covariance were performed for both with attitude pre-test scores being covaried for each design.

The cell post-test means, unadjusted and adjusted for the covariate, and the covariate means for the first analysis, that concerned with attitude toward the Text Mode, appear in Table 9. Results of the analysis of covariance appear in Table 10.

A five-point scale for each of twenty bi-polar adjectives was utilized in the semantic-differential (Appendix A) to measure attitude. The lowest score possible was 20 which would indicate a strong negative attitude. A neutral attitude would be indicated by a score of 60.

The null hypothesis was retained for the variable of selection. That is, there were no significant differences in student attitude toward the Text Mode between the two levels of selection.

TABLE 9

DATA FOR THE FEASIBILITY STUDY DESIGN INDICATED IN TABLE 8 FOR THE DEPENDENT VARIABLE OF ATTITUDE TOWARD THE TEXT MODE OF INSTRUCTION

Cell	Mean of Covariate	Unadjusted Mean of Post-Test	Adjusted Mean of Post-Test
A-V, Free Choice	54.14286	58.14286	56.86052
A-V, No Choice	47.75000	57.50000	57.76537
Text, Free Choice	45.90000	68.53333	69.24658
Tect, No Choice	46.75000	64.25000	64.75747
Class, Free Choice	56.14282	67.85714	66.09060
Class, No Choice	43.58333	53.50000	54.77412
Written-Program, Free Choice	48.00000	62.50000	62.70484
Written-Program, No Choice	48.50000	63.58333	63.66712

TABLE 10

ANALYSIS OF COVARIANCE FOR THE DATA OF TABLE 9

Source of Variance	df	Mean Square	F	P
A (Selection)	1	208.99126	1.22672	>.20
B (Treatment)	3	401.98963	2.35957	<.10
AB	3	137.59708	.80765	>.50
Within	87	170.36655		

For the variable of treatment the null hypothesis was not rejected although the F ratio was close to being significant at the .05 level. Alternatively, there were no significant differences in student attitude toward the Text Mode among the four levels of treatment.

For the next analysis, that concerned with attitude toward the A-V Mode, the cell post-test means and covariate means appear in Table 11. The results of the analysis of covariance appear in Table 12.

TABLE 11

DATA FOR THE FEASIBILITY STUDY DESIGN AS INDICATED IN TABLE8 FOR THE DEPENDENT VARIABLE OF ATTITUDE TOWARD THE A-V MODE OF INSTRUCTION

Cell	Mean of Covariate	Unadjusted Mean of Post-Test	Adjusted Mean of Post-Test
A-V, Free Choice	78.28571	86.28571	84.68863
A-V, No Choice	74.08333	77.83333	77.62674
Text, Free Choice	74.60000	70.90000	70.52245
Text, No Choice	67.91667	70.25000	72.08383
Class, Free Choice	77.28571	70.28571	69.01951
Class, No Choice	70.25000	68.25000	69.31177
Written-Program, Free Choice	76.00000	75.00000	74.15921
Written-Program, No Choice	69.25000	65.91667	67.30932

TABLE 12

ANALYSIS OF COVARIANCE FOR THE DATA OF TABLE 11

Source of Variance	df	Mean Square	F	P
A (Selection)	1	152.67899	1.5253	$>.20$
B (Treatment)	3	524.85938	5.2437	$<.01$
AB	3	104.93824	1.0484	$>.20$
Within	87	100.09202		

As before, the null hypothesis for the variable of selection was retained. Namely, there were no significant differences in student attitude toward the A-V Mode between the two levels of selection.

However, the null hypothesis for the variable of treatment was rejected at the .01 level. That is, there was a significant difference in student attitude toward the A-V Mode among the treatment levels.

Since the analysis dealt with attitude toward the A-V Mode of Instruction, a planned contrast was undertaken in which the mean of the pooled cells of students actually subjected to the A-V Mode was compared with the mean of the pooled cells of students in the study not subjected to the mode.[6] The resulting F ratio of 13.9202 was significant at the .01 level. Thus, it was established that, within the limitations of the design, there was a significant difference in student attitude toward the A-V Mode of Instruction between the students who were actually subjected to the A-V Mode and those students in the study who were not subjected to it, in the direction of developing a stronger positive attitude.

Interesting, if not statistically significant information can be obtained from a study of Table 13, in which cell means for the attitude pre-tests are indicated under appropriate headings.

TABLE 13

MEANS ON EACH OF THE ATTITUDE PRE-TESTS FOR EACH OF THE FREE-CHOICE GROUPS

Cell	Size	Means for Each of the Attitude Pre-Tests			
		A-V Mode Pre-Test	Class Mode Pre-Test	Text Mode Pre-Test	Wr.-Pr.Mode Pre-Test
A-V	7	78.2857	74.2857	54.1429	66.5714
Class	7	77.2857	81.8571	56.1429	75.7143
Text	30	74.6000	80.0667	45.9000	62.7667
Written-Program	4	76.0000	73.5000	48.0000	60.0000
Total	48	75.6458	78.9375	48.7708	64.9792

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[6] B.J. Winer, op. cit.

Of greatest interest perhaps is the apparent discrepancy between the attitude scores and the mode selected by one group of students. The group which selected into the Text Mode indicated a moderately strong attitude, 80.10667, toward the Class Mode of Instruction, and a slightly negative attitude, 45.9000, toward the Text Mode. A score of 60.0000 would indicate a neutral attitude. Since the group consisted of thirty students, it seems unlikely that the discrepancy between attitude and selection could be attributed to chance alone. All ninety-six students in the study were given texts for studying the content of the module. While each of the other modes required the physical presence of the students at the School of Education and additional involvement with an instructional alternative, the Text Mode did not. Many of the students in the group may have thus taken the "mode of least physical effort".

The group which selected into the A-V Mode indicated that its attitude toward the A-V Mode was higher than toward the other available modes. Similarly, the group which selected into the Class Mode indicated that its attitude toward the Class Mode was higher than toward the other modes.

The group selecting the Written-Program Mode, containing only four students, while indicating a higher attitude toward two other modes, did at least indicate a neutral attitude toward their Written-Program Mode. In addition, in terms of "least physical effort" this mode would rank second to the Text Mode, since it simply required checking out a programmed-text from the reserve section of the School of Education Library and reading it there.

The A-V Mode which was also located in the library, required an additional fifteen minute training session and greater organizational effort, such as putting on head phones, adjusting dials, rewinding cassette tapes, etc.

The Class Mode was the only one which really had a "locked in" time restriction for each of its two sessions and no opportunity for a "rerun or reread" through the mode.

Another facet of the feasibility study was the incorporation of regression analysis in the manner of the Cronbach Treatment by Aptitude Interaction Model to determine the relationship between content posttest achievement and each of several aptitudes for each of the treatment levels.[7] Also considered was the extent of interaction or non-parallelism of the regression lines thus established among the treatment levels.

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[7] Lee J. Cronbach. "How Can Instruction Be Adapted To Individual Differences?" Learning and Individual Differences. Columbus: Charles E. Merrill Books, Inc., 1967.

Table 14 illustrates the design utilized for each study as well as the number of students in each cell.

TABLE 14

FEASIBILITY STUDY DESIGN, WITH CELL FREQUENCIES INDICATED, FOR EACH REGRESSION ANALYSIS OF APTITUDE BY CONTENT POST-TEST ACHIEVEMENT

	Treatment			
	A-V Mode	Class Mode	Text Mode	Written-Program Mode
Cell Size	19	19	42	16

Table 15, and Figure 1 summarize the results of the first analysis, that of the aptitude of abstract reasoning by content achievement.

Testing for parallelism of regression over the four treatment levels an F ratio of 1.4882 was determined with a $p > .20$. Thus, no significant interaction or crossing of regression lines was established.

Figure 1 illustrates the plot of the regression line for each treatment level within the range of scores of both variables.

On the basis of the plots in Figure 1, and within the limitations of the design, it appears that the students in the study in the A-V Mode over the entire range of aptitude scores, achieved higher than those of similar aptitude in the other levels of treatment.

Table 16 and Figure 2 summarize the results of the second analysis, that of the aptitude of space relations by content achievement.

Testing for parallelism of regression over the four treatment levels an F ratio of 1.0278 was determined with a $p > .20$. Thus, no significant interaction or crossing of regression lines was established.

TABLE 15

REGRESSION ANALYSIS OF THE APTITUDE OF ABSTRACT THINKING (x) BY CONTENT POST-TEST ACHIEVEMENT (y) FOR THE DESIGN INDICATED IN TABLE 14

Treatment	Equation of Regression Line	Standard Error of Estimate	Correlation Coefficient
A-V	$y = 11.69 + .0235x$	1.54	0.077
Class	$y = 2.52 + .2233x$	3.57	0.324
Text	$y = 1.92 + .2328x$	3.23	0.362
Written-Program	$y = 7.81 + .4389x$	3.07	0.668
All Groups Combined	$y = 1.68 + .2406x$	3.03	0.378

TABLE 16

REGRESSION ANALYSIS OF THE APTITUDE OF SPACE RELATIONS (x) BY CONTENT POST-TEST ACHIEVEMENT (y) FOR THE DESIGN INDICATED IN TABLE 14

Treatment	Equation of Regression Line	Standard Error of Estimate	Correlation Coefficient
A-V	$y = 14.24 +-0.0271x$	1.49	-0.278
Class	$y = 6.52 + 0.0748x$	3.63	0.277
Text	$y = 6.73 + 0.0707x$	3.25	0.344
Written-Program	$y = 6.20 + 0.0550x$	4.03	0.208
All Groups Combined	$y = 8.11 + 0.0494x$	3.19	0.224

FIGURE 1

PLOTS OF THE REGRESSION LINES INDICATED IN TABLE 15

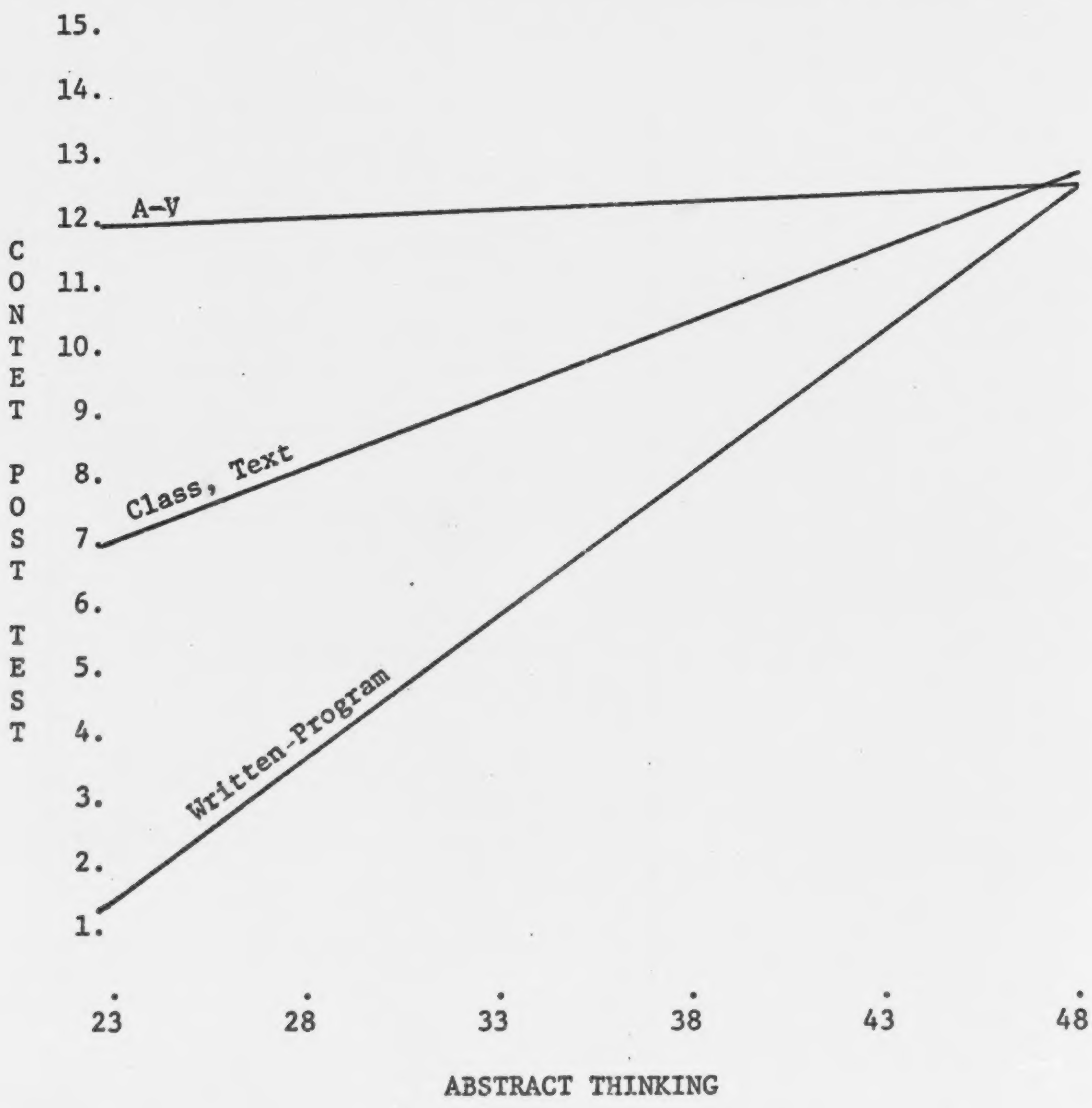

FIGURE 2

PLOTS OF THE REGRESSION LINES INDICATED IN TABLE 16

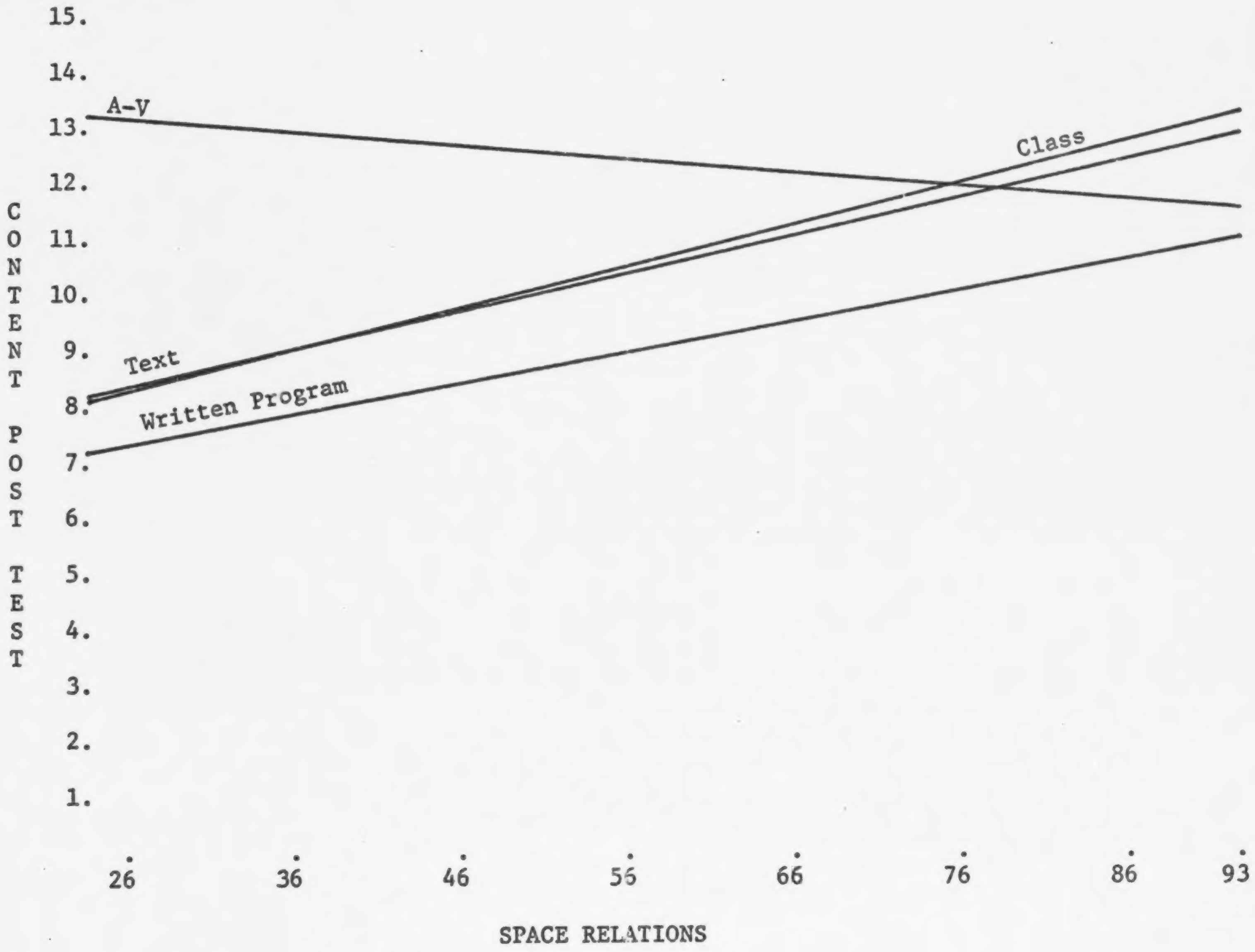

Figure 2 illustrates the plot of the regression line for each treatment level within the range of scores for both variables.

On the basis of the plots in Figure 2, and within the limitations of the design, it appears that students in the study in the A-V Mode with scores below 75 on the aptitude of space relations performed better than those with similar aptitudes in the other levels, while students with scores above 75 performed best in the Class Mode.

Table 17 and Figure 3 summarize the results of the third analysis, that of the aptitude of verbal reasoning by content achievement.

TABLE 17

REGRESSION ANALYSIS OF THE APTITUDE OF VERBAL REASONING (x) BY CONTENT POST-TEST ACHIEVEMENT (y) FOR THE DESIGN INDICATED IN TABLE 14

Treatment	Equation of Regression Line	Standard Error of Estimate	Correlation Coefficient
A-V	$y = 10.07 + 0.0502x$	1.50	0.256
Class	$y = 0.72 + 0.2138x$	3.32	0.478
Text	$y = 3.68 + 0.1449x$	3.27	0.327
Written-Program	$y = 3.94 + 0.1170x$	3.97	0.264
All Groups Combined	$y = 3.68 + 0.1489x$	3.06	0.353

Testing for parallelism of regression over the four treatment levels, an F ratio of 0.5164 was determined with a $p < .50$. Again, no significant interaction or crossing of regression lines was established.

Figure 3 illustrates the plot of the regression line of each treatment level within the range of scores of both variables.

On the basis of the plots in Figure 3, and within the limitations of the design, it appears that students in the study in the A-V Mode with scores below 580 on the aptitude of verbal reasoning performed better than those with similar aptitudes in the other levels, while students with scores above 580 performed best in the Class Mode.

Table 18 and Figure 4 summarize the results of the fourth analysis, that of the aptitude of numerical reasoning by content achievement.

FIGURE 3

PLOTS OF THE REGRESSION LINES INDICATED IN TABLE 17

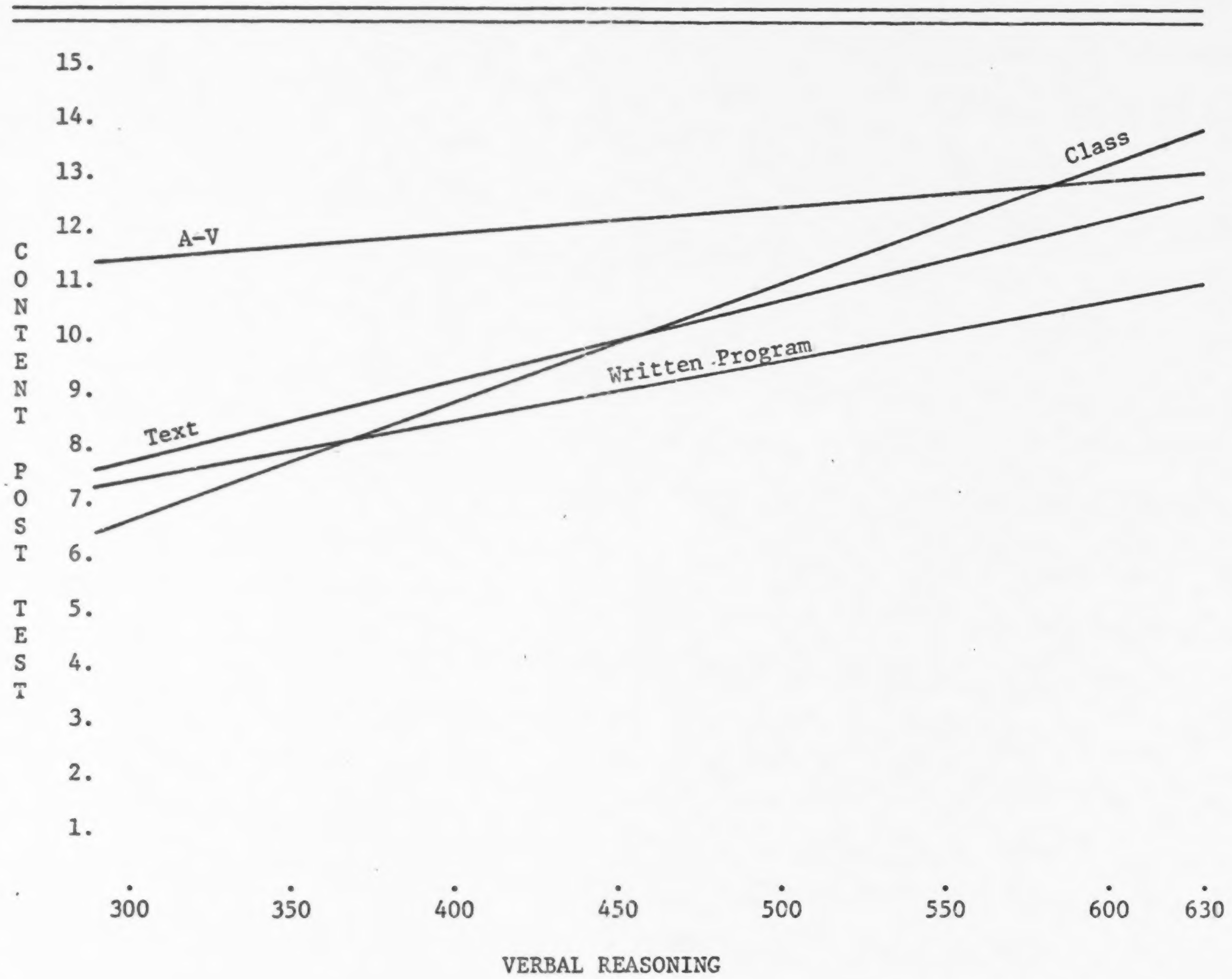

FIGURE 4

PLOTS OF THE REGRESSION LINES INDICATED IN TABLE 18

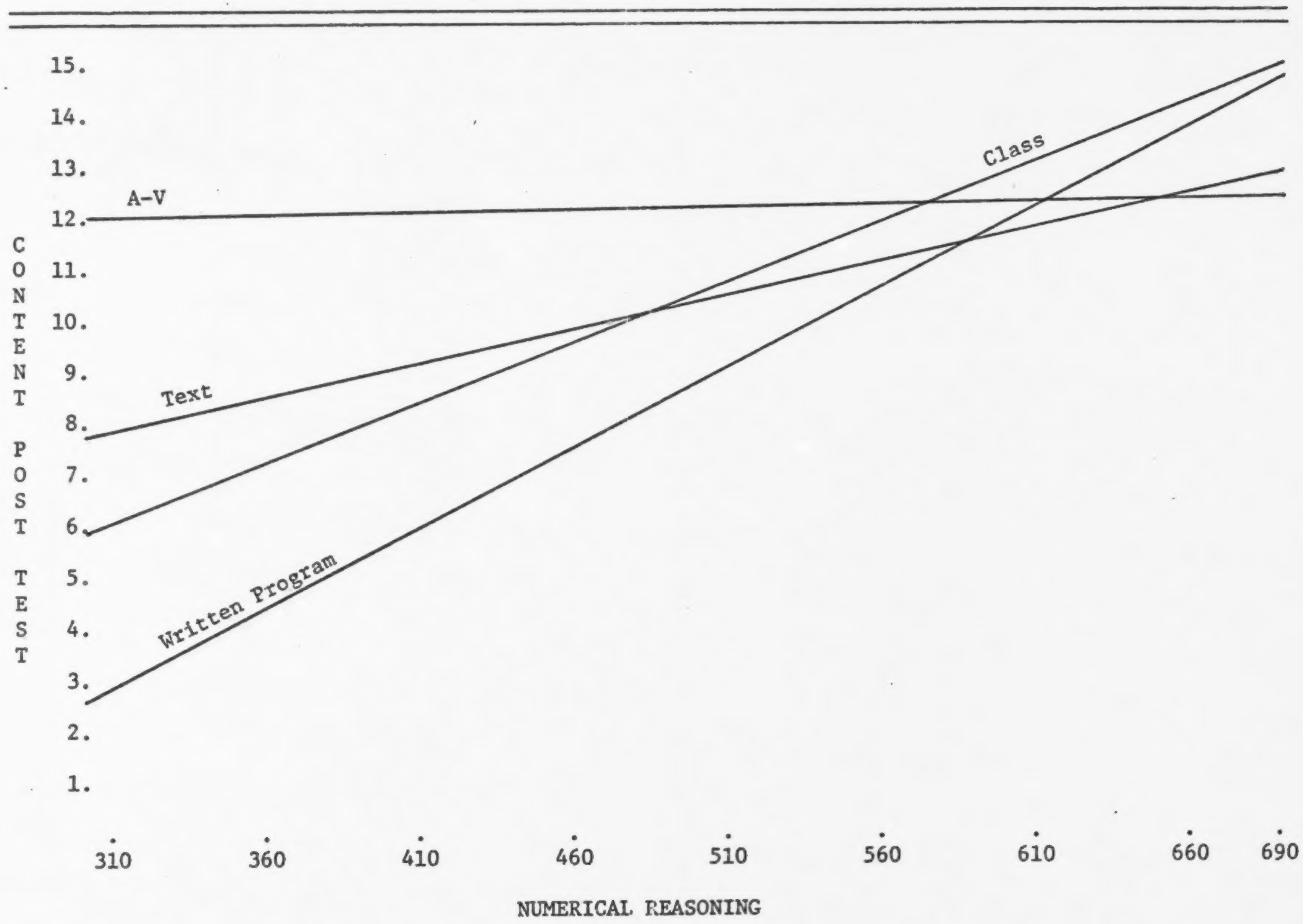

FIGURE 5

PLOTS OF THE REGRESSION LINES INDICATED IN TABLE 19

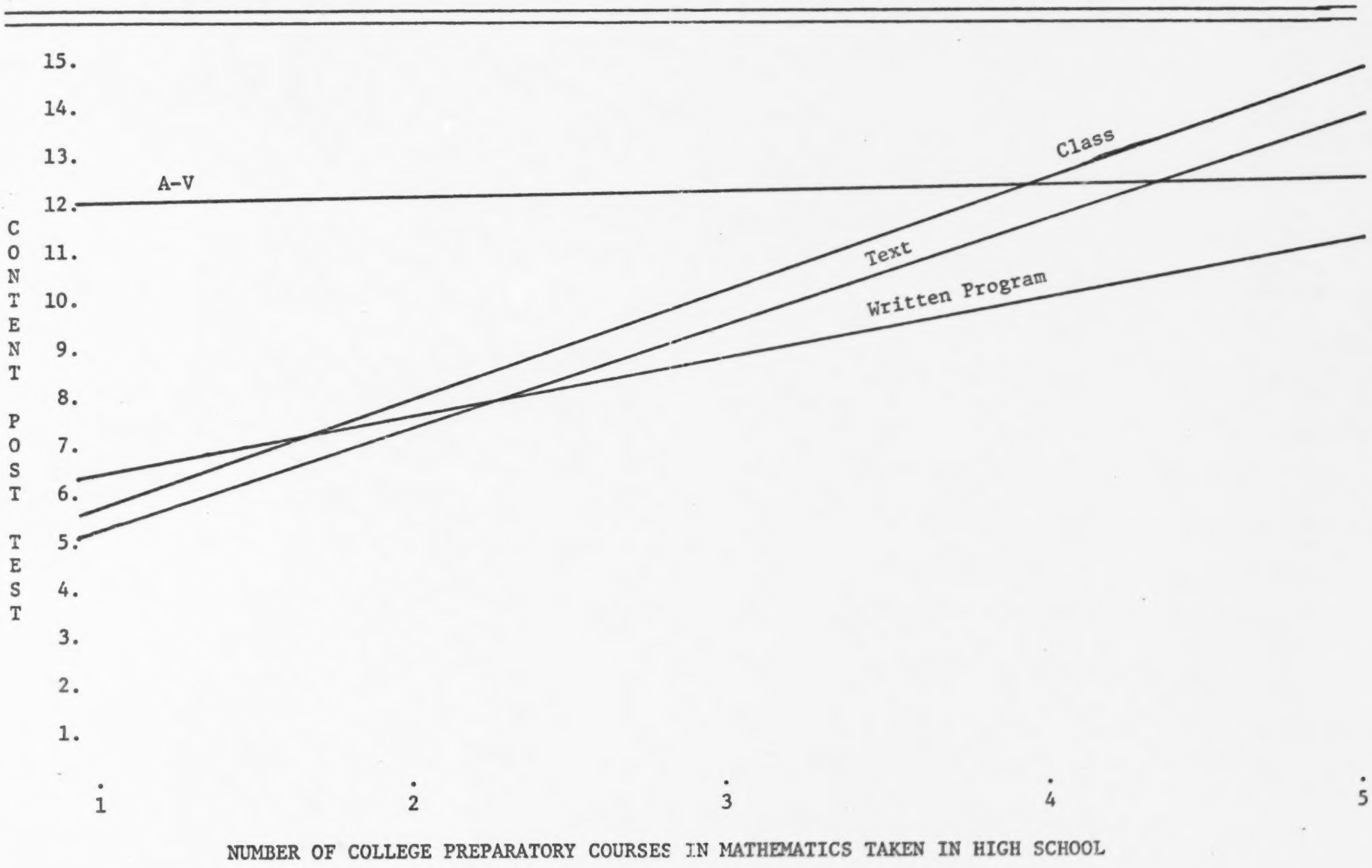

TABLE 18

REGRESSION ANALYSIS OF THE APTITUDE OF NUMERICAL REASONING (x) BY CONTENT POST-TEST ACHIEVEMENT (y) FOR THE DESIGN INDICATED IN TABLE 14

Treatment	Equation of Regression Line	Standard Error of Estimate	Correlation Coefficient
A-V	$y = 12.23 + 0.0074x$	1.55	0.035
Class	$y = -1.33 + 0.2433x$	3.17	0.543
Text	$y = 3.93 + 0.1328x$	3.28	0.319
Written-Program	$y = -6.67 + 0.3155x$	3.11	0.655
All Groups Combined	$y = 1.95 + 0.1736x$	2.98	0.410

Testing forparallelism of regression over the four treatment levels, an F ratio of 2.0488 was determined with a $p > .10$. Once more, no significant interaction or crossing of regression lines was established.

Figure 4 illustrates the plot of the regression line for each treatment level within the range of scores of both variables.

On the basis of the plots in Figure 4, and within the limitations of the design, it appears that students in the study in the A-V Mode with scores below 580 on the aptitude of numerical reasoning performed better than those with similar aptitudes in the other levels, while students with scores above 580 performed best in the Class Mode.

Table 19 and Figure 5 summarize the results of the next regression analysis, that of the number of years of college preparatory courses in mathematics taken in high school by content achievement.

Testing for parallelism of regression over the four treatment levels an F ratio of 1.1178 was determined with a $p > .20$. Thus, no significant interaction or corssing of regression lines was established. Figure 5 illustrates the plot of the regression line for each treatment level within the range of scores of both variables.

On the basis of the plots in Figure 5, and within the limitations of the study, it appears that students in the study in the A-V Mode with less than three years of college preparatory courses in mathematics in high school performed better than those with similar course work in other levels, while students with four or five years of college preparatory courses in mathematics performed best in the Class Mode.

TABLE 19

REGRESSION ANALYSIS OF THE NUMBER OF YEARS OF COLLEGE PREPARATORY COURSES IN MATHEMATICS TAKEN IN HIGH SCHOOL (x) BY CONTENT POST-TEST ACHIEVEMENT (y) FOR THE DESIGN INDICATED IN TABLE 14

Treatment	Equation of Regression Line	Standard Error of Estimate	Correlation Coefficient
A-V	$y = 12.02 + 0.1688x$	1.84	0.081
Class	$y = 3.85 + 2.2469x$	3.38	0.445
Text	$y = 3.43 + 2.1707x$	3.08	0.460
Written-Program	$y = 5.00 + 1.3333x$	3.83	0.367
All Groups Combined	$y = 5.27 + 1.6888x$	3.00	0.397

Table 20 and Figure 6 summarize the results of the final regression analysis, that of the number of three-semester-hour courses in mathematics taken in college by content achievement.

Testing for parallelism of regression over the four treatment levels an F ratio of 0.2248 was obtained with $p > .50$. Hence, no significant interaction or crossing of regression lines was established.

Figure 6 illustrates the plot of the regression line for each treatment level within the range of scores of both variables.

On the basis of the plots in Figure 6, and within the limitations of the study, it appears that students in the study in the A-V Mode with less than five three-semester-hour courses in mathematics in college performed better than those with similar course work in the other levels, while students with five or more courses performed best in the Class Mode.

The remaining data considered was concerned with the time spent by the students in each of the instructional alternatives, their estimate of the work load of the module in the feasibility study, and the utilization of the independent-study learning carrels. All but the data for the utilization of the independent-study learning carrels are summarized in Table 21.

FIGURE 6

PLOTS OF THE REGRESSION LINES INDICATED IN TABLE 20

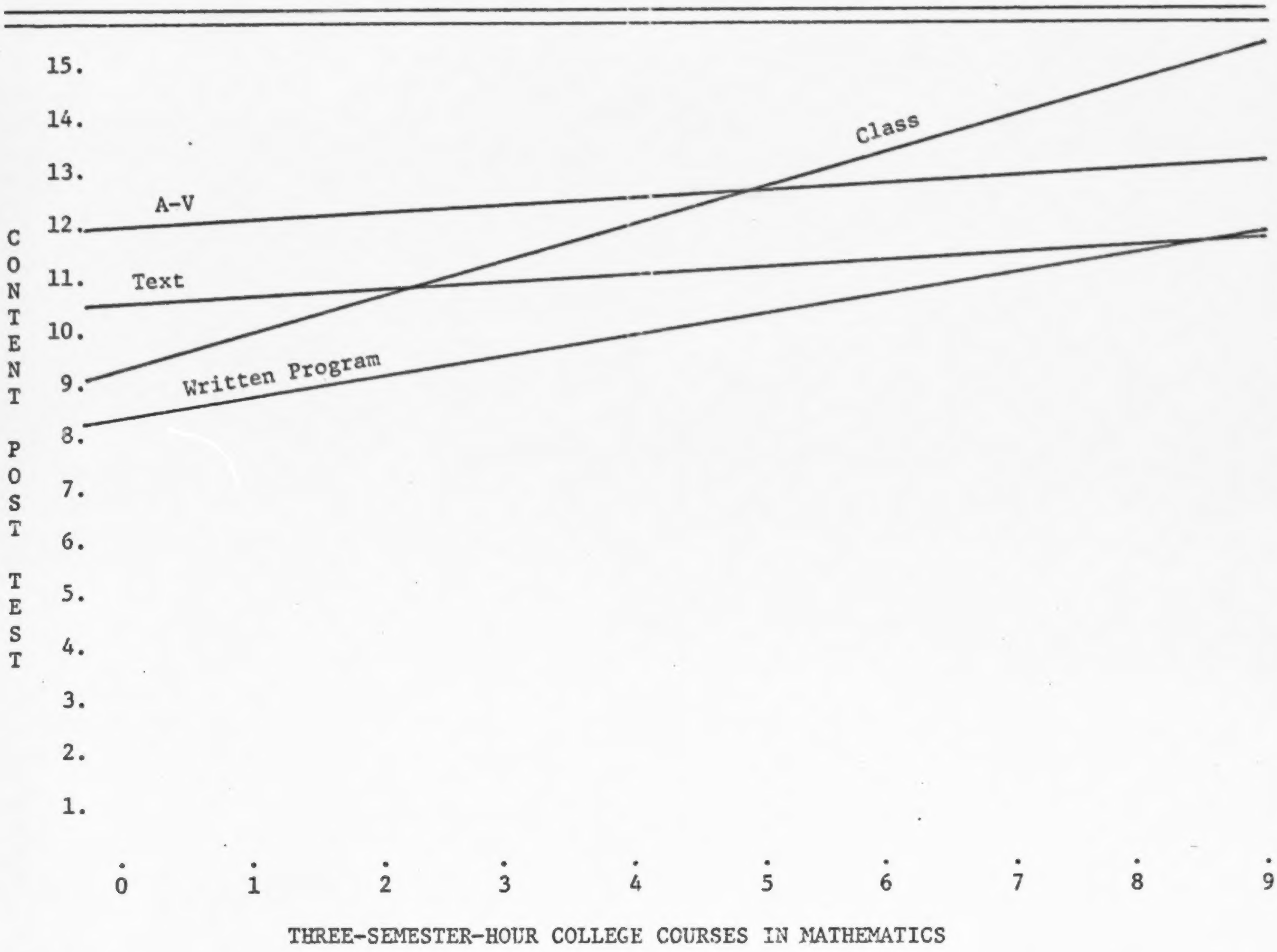

TABLE 20

REGRESSION ANALYSIS OF THE NUMBER OF THREE-SEMESTER-HOUR COURSES IN MATHEMATICS TAKEN IN COLLEGE (x) BY CONTENT POST-TEST ACHIEVEMENT (y) FOR EACH TREATMENT LEVEL IN THE DESIGN INDICATED IN TABLE 14

Treatment	Equation of Regression Line	Standard Error of Estimate	Correlation Coefficient
A-V	$y = 12.38 + 0.1478x$	1.54	0.085
Class	$y = 9.61 + 0.7072x$	3.63	0.279
Text	$y = 10.59 + 0.1782x$	3.45	0.070
Written-Program	$y = 8.70 + 0.4000x$	4.10	0.088
All Groups Combined	$y = 10.57 + 0.2372x$	3.26	0.087

As indicated earlier in this report, there were five independent-study learning carrels set up in the School of Education Library for use by the nineteen students who had the A-V Mode of Instruction as their instructional alternative. During the extent of the study, at no time were more than four of the carrels in use. Usually, only two or three were in use during the prime time periods with the carrels being used very little during much of the evening hours. Thus, a ratio of nineteen students to five carrels seemed too low. A ratio of ten students per carrel would appear to be much more realistic.

The information in Table 21 provides a basis for a multiplicity of comparisons among treatment levels and combinations of data. An interesting observation is that the group (Text Mode, No Choice) which spent the least amount of time, two hours, on the module, rated it highest in terms of the work load (1.9). While the group (A-V Mode, No Choice) which spent the next least amount of time, two and one-tenth hours, rated the module lowest in terms of work load (1.1). One gets a good indication of the instability of generalizations made from data of this nature with small sample sizes.

TABLE 21

MEAN ESTIMATES OF TIME, IN HOURS, SPENT IN THE TEXT MODE AND THE OTHER AVAILABLE MODE OF INSTRUCTIONAL ALTERNATIVE, AND THE MEAN ESTIMATE OF WORK LOAD, BY EACH OF SELECTED GROUPINGS OF STUDENTS

Group	Number in Group	Number of Hours in Text Mode	Number of Hours in Alt. Mode	Total Number of Hours	Work Load*
A-V, Free Choice	7	1.9	2.6	4.5	1.3
A-V, No Choice	12	0.6	1.5	2.1	1.1
A-V,Total	19	1.1	1.9	3.0	1.2
Class, Free Choice	7	2.1	2.5	4.6	1.4
Class, No Choice	12	1.2	2.4	3.6	1.7
Class,Total	19	1.5	2.4	3.9	1.6
Text, Free Choice	30	2.7	0.0	2.7	1.5
Text, No Choice	12	2.0	0.0	2.0	1.9
Text,Total	42	2.5	0.0	2.5	1.6
Wr. Pr., Free Choice	4	1.5	2.3	3.8	1.5
Wr. Pr., No Choice	12	1.9	1.6	3.5	1.7
Wr. Pr., Total	16	1.8	1.8	3.5	1.6
All Free Choice Combined	48	2.4	1.1	3.5	1.4
All No Choice Combined	48	1.4	1.6	3.0	1.6
All Group Combined	96	1.9	1.4	3.3	1.5

*0=Much too Easy
1=Moderately Easy
2=Realistic
3=Moderately Difficult
4=Much too Difficult

Perhaps the most general grouping, that of the entire group of ninety-six students in the study, provides the most useful and trustworthy data. That groups mean for time in the Text Mode was just under two hours and its mean for time spent in the appropriate instructional alternative was just under one and one half hours which, when combined, give an average per-student total time committed to the module, excluding the two forty-minute tests, of slightly less than three and one-half hours. Thus, the group as a whole judged the module to be midway between moderately easy and realistic for the content considered in the study.

Prior to the feasibility study, a test-retest reliability coefficient was established for both the content pre-test and the content post-test using data obtained for that purpose by the administration of the tests to a group of twenty-five graduate students at the School of Education. The reliability coefficient for the pre-test was 1.95 while that for the post-test was .94.

Table 22 lists the percentage of correct responses to total responses for each item on the content pre-test and post-test for each of the treatment levels for all of the groups combined.

Recommendations. On the basis of the myriad of analyses just reported, unobtrusive measures observed, and general inner feelings of the writer, what really can be said about the main concern of the study? That is, can students learn to achieve the selected criteria by each of the instructional alternatives developed for the study?

The performance criteria module contained a total of fifteen performance criteria. The ninety-six students in the study had a mean pre-test score of 2.4 and a mean post-test score of 11.1 out of the possible total of 15 for each test. As indicated earlier, no significant differences were found between levels of selection or among levels of treatment with regard to adjusted content post-test scores. While a mean score of 11.1 does not indicate complete mastery of the content, it does indicate achievement at a sufficient level (a mean of 74% correct), to answer the above question in the affirmative. For mathematics content, then, if one accepts the premise that the content module considered is typical of the others in the mathematics component, and it was selected for the study to great extent because of that premise, it does indeed seem feasible that students can learn the required mathematics content via any of the instructional alternatives indicated in the study.

The study, however, raised more questions than it answered. While no statistically defensible statement can be made with regard to recommending one mode of instruction over the others, or with regard to guiding students into any given mode on the basis of aptitude, some interesting observations can be made.

TABLE 22

PERCENTAGE OF CORRECT RESPONSES TO TOTAL RESPONSES FOR EACH ITEM ON THE CONTENT PRE-TEST AND POST-TEST FOR SELECTED GROUPINGS OF STUDENTS

Item	A-V Mode (19 students)		Class Mode (19 students)		Text Mode (42 students)		Written-Program Mode (16 students)		All groups combined (96 students)	
	Pre.	Post.	Pre.	Post.	Pre.	Post.	Pre.	Post.	Pre.	Post.
1	0.00	84.21	10.53	68.42	7.14	80.95	12.50	50.00	7.29	73.96
2	10.53	89.47	5.26	78.95	14.29	66.67	6.25	75.00	10.42	75.00
3	0.00	63.16	0.00	52.63	2.38	45.24	0.00	18.75	1.04	45.83
4	5.26	89.47	0.00	84.21	0.00	64.29	0.00	37.50	1.04	68.75
5	26.32	100.00	15.79	94.74	21.43	90.48	18.75	75.00	20.83	90.63
6	36.84	52.63	15.79	47.37	30.95	71.43	31.25	37.50	29.17	57.29
7	89.47	94.74	78.95	94.74	76.19	92.86	87.50	87.50	81.25	92.71
8	15.79	100.00	5.26	89.47	4.76	95.24	0.00	93.75	6.25	94.79
9	31.58	100.00	15.79	94.74	42.86	88.10	6.25	93.75	29.17	92.71
10	0.00	57.89	5.26	36.84	7.14	61.90	0.00	37.50	4.17	52.08
11	10.53	100.00	5.26	89.47	11.90	97.62	0.00	87.50	8.33	94.79
12	21.05	73.68	10.53	47.37	9.52	61.90	12.50	56.25	12.50	60.42
13	15.79	89.47	10.53	78.95	9.52	69.05	6.25	75.00	10.42	76.04
14	15.79	89.47	5.26	68.42	9.52	61.90	6.25	62.50	9.38	68.75
15	10.53	78.95	0.00	68.42	11.90	54.76	12.50	62.50	9.38	63.54

For example, although no statistical significance was established, the students in the A-V Mode and in the Class Mode did have higher adjusted mean scores on the content post-test than did students in the other two groups. Also the A-V Mode and the Class Mode were each rated higher on the attitude measurements by the total group of ninety-six students in the study than were the other two modes. In addition, for each of the six categories of aptitude considered in the study, the students of lower aptitude in the A-V Mode scored higher on the content post-test than did the students of similar aptitude in each of the other three modes, and, in the aptitude of abstract thinking, the students in the A-V Mode scored higher at every level of aptitude than did the students in each of the other three groups. In each of the categories of aptitude, except abstract thinking, the students with higher levels of aptitude in the Class Mode scored higher on the content post-test than students of similar aptitude in each of the other three modes.

Is it chance alone which accounted for the consistently higher performance by the students in the A-V and Class Modes? On the basis of the analyses in the present study, the response to this question would have to be yes, but the writer suspects otherwise. In the light of reasonable consistency in results, observably high sampling errors, and the presence of small sample sizes in a few of the groups there exists a strong feeling that significance of results could be obtained in a more precisely controlled experiment with larger sample sizes.

A major recommendation then is that this feasibility study be considered as a pilot study for a much larger and longer one to seek stronger statements concerning the questions raised.

Secondly, regardless of the implications suggested above, the study did demonstrate that the basic notion of designing a curriculum for pre-service teachers on the basis of explicitly stated performance criteria and well defined instructional alternatives is feasible, and it is strongly recommended that efforts to develop such a curriculum be continued.

As originally developed, the performance criteria modules for the content section of the mathematics component were developed for two levels, generalist and specialist. A student seeking competence at the generalist level would have been required to successfully complete the performance criteria modules developed for the generalist. "Success" was to be measured by an arbitrarily set score (perhaps of 70% or more correct) on the post-test for each module.

The specialist would have been required to successfully complete the same performance criteria modules as the generalist but with a higher percentage of items correct. In addition, the person seeking a rating of specialist would have had to successfully complete a more in depth supplement to each of the modules for the generalist.

As a result of the feasibility study, and its findings with regard to estimates of work load and time spent by each group in the different instructional alternatives, as well as by the recognized complexities of the original plan with unwieldy numbers of content modules and tests to develop and administer, it is recommended that the performance criteria for both the generalist and the specialist be combined for each topic into a single module with one pre-test and post-test given to all students. This modification would in effect make each of the newly conceived performance criteria modules half-again-as-large as the one considered in this feasibility study.

This arrangement has several other advantages over the originally conceived plan. It provides greater exposure of mathematics content to more students. It fosters greater interaction between students who have a deeper interest in mathematics and those who "just" need to meet the generalist requirements. It minimizes scheduling difficulties of the modular offerings and eliminates the need for twice the number of tests.

Under the modified plan, the generalist would be required to successfully complete at least 60% of the performance criteria in each module while the specialist would have to complete at least 90% of the performance criteria. On this basis each performance criteria module would be worth one modular credit to the generalist and one and one-half modular credits to the specialist. A minimum of twenty modular credits or the equivalent of four semester hours of credit would thus be earned by the generalist and thirty modular credits or the equivalent of six semester hours of credit by the specialist for the entire twenty-modules content section. Students completing the above sequence would have essentially fulfilled the "A" recommendation of the Committee on the Undergraduate Program in Mathematics (CUPM) for the training of teachers of elementary school mathematics. Students wishing to specialize in teaching elementary school mathematics would also be expected to fulfill the "B" and "C" recommendations of CUPM, that of a three-semester-hour course devoted to the basic concepts of algebra and a similar course in informal geometry, both to be offered by the Mathematics Department.

Facilities, Equipment and Materials

In order to implement a pre-service program geared to actively involving students in the exploration of mathematical concepts utilizing various multi-media approaches, and in the actual teaching of elementary students, special facilities and equipment are, of course, needed.

As part of the feasibility study, a mathematics learning center was conceived and initially equipped, at least on paper, which would facilitate the implementation of the recommended program for the mathematics component. In order to stay within the physical limitations of most existing buildings, including the School of Education at the University of Massachusetts, the Mathematics Learning Center was planned around the utilization of two side-by-side standard classrooms each with dimensions of twenty-four by thirty-two feet giving a total of forty-eight by thirty-two feet. One section of this area would be fully equipped to facilitate groups of up to thirty students for both class sessions and expressive experiences. The rest of the area would be partitioned to provide space for independent-study carrels, small group meeting areas, equipment and material checkout center, reference shelves, microteaching station, and duplicating and model building areas. It is expected that such a facility would be able to handle a maximum of sixty students at any one time including thirty in a large group session and thirty using the other facilities available. Appendix F lists the budget for the initial purchase of equipment and supplies to make the Mathematics Learning Center operational. Additional equipment and supplies would be purchased as necessary to keep the laboratory completely up-to-date with the needs of elementary mathematics teachers.

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Appendix A

SEMANTIC-DIFFERENTIAL-ATTITUDE MEASURE
(PRE-TEST AND POST-TEST)

Instructions. The purpose of this study is to measure the meaning of certain concepts by use of a series of descriptive scales. You will be asked to react to four concepts. Below each concept is a list of adjective pairs separated by five spaces. For each adjective pair you are to indicate your response in the appropriate corresponding space on the standard answer sheet provided.

If you feel that the concept you are rating is very closely related to one end of the adjective scale, darken the appropriate corresponding space on the answer sheet as follows:

1 2 3 4 5
bland ■ ☐ ☐ ☐ ☐ savory

OR

1 2 3 4 5
bland ☐ ☐ ☐ ☐ ■ savory

If you feel that the concept you are rating is slightly related to one end of the adjective scale, darken the appropriate corresponding space on the answer sheet as follows:

1 2 3 4 5
bland ☐ ■ ☐ ☐ ☐ savory

OR

1 2 3 4 5
bland ☐ ☐ ☐ ■ ☐ savory

If you feel that the concept you are rating is equally associated with both sides of the adjective scale, is completely unrelated to either side, or is neutral to both sides, darken the middle space on the answer sheet as follows:

1 2 3 4 5
bland ☐ ☐ ■ ☐ ☐ savory

Completely fill in the appropriate corresponding space on your answer sheet for each adjective pair. Never darken more than one space for each scale.

Respond to every adjective pair. Do not omit any. Make your responses on the basis of what the concept means to you.

Mark each item as an independent judgement. It is usually better if you work quickly through all of the scales. Remember that it is your first impression or "feeling" about the concept and adjective pair that is most important. On the other hand, try not to be careless in responding to the items.

Class-Participation Mode of Instruction

This mode of instruction consists of class interaction with content as presented by an instructor. All of the content for which each student is responsible to learn is considered in detail with appropriate explorations, visual and/or oral illustrations, and examples for the students to work on in class. Active class participation is encouraged and there is ample opportunity for student questions and student initiated discussions. Each student is also given a standard textbook which covers the same content considered in this mode of instruction.

1. good ____ ____ ____ ____ ____ bad
2. importent ____ ____ ____ ____ ____ potent
3. complete ____ ____ ____ ____ ____ incomplete
4. untimely ____ ____ ____ ____ ____ timely
5. successful ____ ____ ____ ____ ____ unsuccessful
6. meaningful ____ ____ ____ ____ ____ meaningless
7. passive ____ ____ ____ ____ ____ active
8. useless ____ ____ ____ ____ ____ useful
9. true ____ ____ ____ ____ ____ false
10. negative ____ ____ ____ ____ ____ positive
11. bland ____ ____ ____ ____ ____ savory
12. valuable ____ ____ ____ ____ ____ worthless
13. thoughtless ____ ____ ____ ____ ____ thoughtful
14. interesting ____ ____ ____ ____ ____ uninteresting
15. convenient ____ ____ ____ ____ ____ inconvenient
16. ugly ____ ____ ____ ____ ____ beautiful
17. bitter ____ ____ ____ ____ ____ sweet
18. fair ____ ____ ____ ____ ____ unfair
19. pleasant ____ ____ ____ ____ ____ unpleasant
20. harmful ____ ____ ____ ____ ____ helpful

Semi-Automatic Audio-Visual Mode of Instruction

This mode of instruction consists of individual interaction with content as presented in an independent-study carrel equipped with a semi-automatic audio-visual instruction system. All of the content for which each student is responsible to learn is considered in detail with appropriate explorations, visual and/or oral illustrations, and examples for the student to work on during contact with the system. Each student is also given a standard textbook covering the same content considered in this mode of instruction.

41. good ____ ____ ____ ____ ____ bad

42. impotent ____ ____ ____ ____ ____ potent

43. complete ____ ____ ____ ____ ____ incomplete

44. untimely ____ ____ ____ ____ ____ timely

45. successful ____ ____ ____ ____ ____ unsuccessful

46. meaningful ____ ____ ____ ____ ____ meaningless

47. passive ____ ____ ____ ____ ____ active

48. useless ____ ____ ____ ____ ____ useful

49. true ____ ____ ____ ____ ____ false

50. negative ____ ____ ____ ____ ____ positive

51. bland ____ ____ ____ ____ ____ savory

52. valuable ____ ____ ____ ____ ____ worthless

53. thoughtless ____ ____ ____ ____ ____ thoughtful

54. interesting ____ ____ ____ ____ ____ uninteresting

55. convenient ____ ____ ____ ____ ____ inconvenient

56. ugly ____ ____ ____ ____ ____ beautiful

57. bitter ____ ____ ____ ____ ____ sweet

58. fair ____ ____ ____ ____ ____ unfair

59. pleasant ____ ____ ____ ____ ____ unpleasant

60. harmful ____ ____ ____ ____ ____ helpful

Written-Programmed-Instruction Mode of Instruction

This mode of instruction consists of individual interaction with content as presented in a written-programmed-instruction format. All of the content for which each student is responsible to learn is considered in detail with appropriate explorations, visual illustrations, and examples for the student to work on during contact with the material. Each student is also given a standard textbook covering the same content considered in this mode of instruction.

81. good ____ ____ ____ ____ ____ bad

82. impotent ____ ____ ____ ____ ____ potent

83. complete ____ ____ ____ ____ ____ incomplete

84. untimely ____ ____ ____ ____ ____ timely

85. successful ____ ____ ____ ____ ____ unsuccessful

86. meaningful ____ ____ ____ ____ ____ meaningless

87. passive ____ ____ ____ ____ ____ active

88. useless ____ ____ ____ ____ ____ useful

89. true ____ ____ ____ ____ ____ false

90. negative ____ ____ ____ ____ ____ positive

91. bland ____ ____ ____ ____ ____ savory

92. valuable ____ ____ ____ ____ ____ worthless

93. thoughtless ____ ____ ____ ____ ____ thoughtful

94. interesting ____ ____ ____ ____ ____ uninteresting

95. convenient ____ ____ ____ ____ ____ inconvenient

96. ugly ____ ____ ____ ____ ____ beautiful

97. bitter ____ ____ ____ ____ ____ sweet

98. fair ____ ____ ____ ____ ____ unfair

99. pleasant ____ ____ ____ ____ ____ unpleasant

100. harmful ____ ____ ____ ____ ____ helpful

Standard-Textbook Mode of Instruction

This mode of instruction consists of individual interaction with content as presented in a standard-textbook format. All of the content for which the student is responsible to learn is considered in detail with appropriate explorations, visual illustrations, and examples for the student to work on during contact with the material. No other mode of instruction is available to the student.

121. good ____ ____ ____ ____ ____ bad

122. impotent ____ ____ ____ ____ ____ potent

123. complete ____ ____ ____ ____ ____ incomplete

124. untimely ____ ____ ____ ____ ____ timely

125. successful ____ ____ ____ ____ ____ unsuccessful

126. meaningful ____ ____ ____ ____ ____ meaningless

127. passive ____ ____ ____ ____ ____ active

128. useless ____ ____ ____ ____ ____ useful

129. true ____ ____ ____ ____ ____ false

130. negative ____ ____ ____ ____ ____ positive

131. bland ____ ____ ____ ____ ____ savory

132. valuable ____ ____ ____ ____ ____ worthless

133. thoughtless ____ ____ ____ ____ ____ thoughtful

134. interesting ____ ____ ____ ____ ____ uninteresting

135. convenient ____ ____ ____ ____ ____ inconvenient

136. ugly ____ ____ ____ ____ ____ beautiful

137. bitter ____ ____ ____ ____ ____ sweet

138. fair ____ ____ ____ ____ ____ unfair

139. pleasant ____ ____ ____ ____ ____ unpleasant

140. harmful ____ ____ ____ ____ ____ helpful

APPENDIX B

PRE-TEST

Last Name First Name

1. In a concise statement define the concept of a numeration system.

2. In a concise statement indicate the relationship of the number of standard symbols utilized in any place-value system of numeration to the number used as a base for grouping in that same place-value system.

3. In a concise statement indicate the place-value principle for place-value systems of numeration.

4. In a concise statement indicate the additive principle for place-value systems on numeration.

5. Indicate the set of standard symbols utilized in the decimal place-value system of numeration.

6. Indicate the place value of each position and the total value of each digit in the following decimal numeral: 6284

position 3 _____
position 2 _____
position 1 _____
position 0 _____

digit 6 _____
digit 2 _____
digit 8 _____
digit 4 _____

7. Indicate in a non-expontential form of decimal notation the value of the following decimal numeral:

3^4

8. Indicate the expanded notational form utilizing exponents of the following decimal numeral:

7534

9. Indicate the set of standard symbols utilized in the base six place-value system of numeration.

10. Indicate (in decimal notation) the place-value of each position and the total value of each digit in the following base four numeral: 2103_{four}

position 3 _____
position 2 _____
position 1 _____
position 0 _____

digit 2 _____
digit 1 _____
digit 0 _____
digit 3 _____

11. Indicate (in decimal notation) the expanded notational form utilizing exponents of the following numeral:

4536_{seven}

12. Complete the corresponding base three numeral for each of the first twenty counting numbers as indicated below in decimal notation:

$1_{ten} = \underline{\qquad}_{three}$

$2_{ten} = \underline{\qquad}_{three}$

$3_{ten} = \underline{\qquad}_{three}$

$4_{ten} = \underline{\qquad}_{three}$

$5_{ten} = \underline{\qquad}_{three}$

$6_{ten} = \underline{\qquad}_{three}$

$7_{ten} = \underline{\qquad}_{three}$

$8_{ten} = \underline{\qquad}_{three}$

$9_{ten} = \underline{\qquad}_{three}$

$10_{ten} = \underline{\qquad}_{three}$

$11_{ten} = \underline{\qquad}_{three}$

$12_{ten} = \underline{\qquad}_{three}$

$13_{ten} = \underline{\qquad}_{three}$

$14_{ten} = \underline{\qquad}_{three}$

$15_{ten} = \underline{\qquad}_{three}$

$16_{ten} = \underline{\qquad}_{three}$

$17_{ten} = \underline{\qquad}_{three}$

$18_{ten} = \underline{\qquad}_{three}$

$19_{ten} = \underline{\qquad}_{three}$

$20_{ten} = \underline{\qquad}_{three}$

13. $2015_{six} = \underline{\qquad}_{ten}$

14. $79_{ten} = \underline{\qquad}_{three}$

15. $1304_{five} = \underline{\qquad}_{four}$

APPENDIX C

List of General Objectives and Student Performance Criteria for METEP Module # 02030132 Numeration Systems for the System of Whole Numbers

1. General Objective: Understanding of the concept of a numeration system.

   Performance Criterion: The student will in a concise statement define the concept of a numeration system.

2. General Objective: Understanding of the relationship of the number of standard symbols or digits utilized in any place-value system of numeration to the number used as a basis for grouping in that same place-value system.

   Performance Criterion: The student will in a concise statement indicate the relationship of the number of standard symbols utilized in any place-value system of numeration to the number used as a basis for grouping in that same place-value system.

3. General Objective: Understanding of the place-value principle for place-value systems of numeration.

   Performance Criterion: The student will in a concise statement indicate the place-value principle for place-value systems of numeration.

4. General Objective: Understanding of the additive principle for place-value systems of numeration.

   Performance Criterion: The student will in a concise statement indicate the additive principle of place-value systems of numeration.

5. General Objective: Understanding of the decimal place-value system of numeration for the system of whole numbers.

   Performance Criterion: The student will indicate in writing the set of standard symbols utilized in the decimal place-value system of numeration for the system of whole numbers.

6. General Objective: Understanding of the decimal-place value system of numeration for the system of whole numbers.

   Performance Criterion: Given a decimal numeral of four or less digits for a whole number, the student will indicate in writing the place value of each position and the total value of each digit in that numeral.

7. General Objective: Understanding of the concept of exponents as it relates to the reading and writing of decimal numerals for whole numbers.

   Performance Criterion: Given a decimal numeral in exponential form for a whole number, the student will indicate the value of that numeral with a decimal numeral in a non-exponential form.

8. General Objective: Understanding of the concept of expanded notation for decimal numerals for whole numbers.

   Performance Criterion: Given a decimal numeral of four or less digits for a whole number, the student will indicate in writing the expanded notational form of the numeral utilizing exponents.

9. General Objective: Understanding of place-value systems of numeration for the system of whole numbers which have bases less than ten.

   Performance Criterion: For any given place-value system of numeration for the system of whole numbers having a base less than ten, the student will indicate in writing the set of standard symbols utilized in that system of numeration.

10. General Objective: Understanding of place-value systems of numeration for the system of whole numbers which have bases less than ten.

    Performance Criterion: Given a numeral of four or less digits for a whole number written in a place-value system of numeration having a base less than ten, the student will indicate in writing (in decimal notation) the place value of each position and the total value of each digit in that numeral.

11. General Objective: Understanding of the concept of expanded notation for numerals for whole numbers written in a place-value system of numeration having a base less than ten.

    Performance Criterion: Given a numeral of four or less digits for a whole number written in a place-value system of numeration having a base less than ten, the student will indicate in writing (in decimal notation) the expanded notational form of the numeral utilizing exponents.

12. General Objective: Understanding of the process of counting utilizing numerals of place-value systems of numeration which have bases less than ten.

    Performance Criterion: The student will indicate in writing in ascending order, the numerals of any given place-value system of numeration having a base less than ten for the first twenty counting numbers.

13. General Objective: Ability to rename in the decimal place-value system of numeration a whole number named by a numeral in any given place-value system of numeration having a base less than ten.

Performance Criterion: Given a numeral of four or less digits for a whole number written in any given place-value system of numeration having a base less than ten, the student will indicate in writing its corresponding decimal numeral.

14. General Objective: Ability to rename in any given place-value system of numeration having a base less than ten, a whole number named by a decimal numeral.

Performance Criterion: Given a numeral of four or less digits for a whole number written as a decimal numeral, the student will indicate in writing its corresponding numeral in any given place-value system of numeration having a base less than ten.

15. General Objective: Ability to rename in any given place-value system of numeration having a base less than ten, a whole number named by a numeral in any other given place-value system of numeration having a base less than ten.

Performance Criterion: Given a numeral of four or less digits for a whole number written in any given place-value system of numeration having a base less than ten, the student will indicate in writing its corresponding numeral in any other given place-value system of numeration having a base less than ten.

APPENDIX D

POST-TEST

____
Last Name First Name

1. In a concise statement define the concept of a numeration system.

2. In a concise statement indicate the relationship of the number of standard symbols utilized in any place-value system of numeration to the number used as a base for grouping in that same place-value system.

3. In a concise statement indicate the place value principle for place-value systems of numeration.

4. In a concise statement indicate the additive principle for place-value systems of numeration.

5. Indicate the set of standard symbols utilized in the decimal place-value system of numeration.

6. Indicate the place value of each position and the total value of each digit in the following decimal numeral: 9735

position 3 _____
position 2 _____
position 1 _____
position 0 _____

digit 9 _____
digit 7 _____
digit 3 _____
digit 5 _____

7. Indicate in a non-expontential form of decimal notation the value of the following decimal numeral:

5^6

8. Indicate the expanded notational form utilizing exponents of the following decimal numeral:

4907

9. Indicate the set of standard symbols utilized in the base eight place-value system of numeration.

10. Indicate (in decimal notation) the place value of each position and the total value of each digit in the following base six numeral: 5312_{six}

position 3 _____
position 2 _____
position 1 _____
position 0 _____

digit 5 _____
digit 3 _____
digit 1 _____
digit 2 _____

11. Indicate (in decimal notation) the expanded notational form utilizing exponents of the following numeral:

8753_{nine}

12. Complete the corresponding base four numeral for each of the first twenty counting numbers as indicated below in decimal notation:

$1_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$2_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$3_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$4_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$5_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$6_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$7_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$8_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$9_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$10_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$11_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$12_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$13_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$14_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$15_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$16_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$17_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$18_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$19_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$
$20_{\text{ten}} = \underline{\hspace{2cm}}_{\text{four}}$

13. $6307_{\text{eight}} = \underline{\hspace{2cm}}_{\text{ten}}$

14. $13_{\text{ten}} = \underline{\hspace{2cm}}_{\text{two}}$

15. $3021_{\text{four}} = \underline{\hspace{2cm}}_{\text{five}}$

APPENDIX E

QUESTIONNAIRE

1. How many years of college preparatory mathematics (beginning with elementary algebra or its equivalent) did you receive credit for during high school?

   0. none
   1. one year
   2. two years
   3. three years
   4. four years
   5. five years
   6. six years

2. How many three-semester-hour courses in mathematics did you receive credit for during college? (If you received credit in other than three-semester-hour units, indicate the total semester hours taken divided by three and, if necessary, rounded off to the next whole number.)

   0. none
   1. one course (three semester hours)
   2. two courses (six semester hours)
   3. three courses (nine semester hours)
   4. four courses (twelve semester hours)
   5. five courses (fifteen semester hours)
   6. six courses (eighteen semester hours)
   7. seven courses (twenty-one semester hours)
   8. eight courses (twenty-four semester hours)
   9. nine or more courses (twenty-seven or more semester hours)

3. Was one of the above courses Math 111, Introductory Mathematics, or its equivalent taken at another university?

   0. no
   1. yes

4. Which of the following responses most clearly represents the total time you spent studying, alone and/or with others of your group, using the commercially prepared text-booklet as your primary focus?

   0. less than one-half hour
   1. one-half hour to one and one-half hours
   2. one and one-half hours to two and one-half hours
   3. two and one-half hours to three and one-half hours
   4. three and one-half hours to four and one-half hours
   5. four and one-half hours to five and one-half hours
   6. five and one-half hours to six and one-half hours
   7. six and one-half hours to seven and one-half hours
   8. seven and one-half hours to eight and one-half hours
   9. more than eight and one-half hours

5. Which of the following responses most clearly represents the total time you spent studying, alone and/or with others of your group, using the instructional alternative available to your group? (Since Group B had only the commerically prepared text-booklet as an instructional mode, members of Group B should not respond to this question.)

   0. less than one-half hour
   1. one-half hour to one and one-half hours
   2. one and one-half hours to two and one-half hours
   3. two and one-half hours to three and one-half hours
   4. three and one-half hours to four and one-half hours
   5. four and one-half hours to five and one-half hours
   6. five and one-half hours to six and one-half hours
   7. six and one-half hours to seven and one-half hours
   8. seven and one-half hours to eight and one-half hours
   9. more than eight and one-half hours

6. Using the "yardstick" of the content of this module being designed for a typical week of work in a three-semester-hour course for non-mathematics majors or minors, what is your selection as the most appropriate response to this item?

   0. much too easy for one week of work
   1. moderately easy for one week of work
   2. realistic for one week of work
   3. moderately difficult for one week of work
   4. much too difficult for one week of work

APPENDIX F

INITIAL BUDGET FOR THE MATHEMATICS LEARNING CENTER

ITEM	QTY	DESCRIPTION	UNIT	TOTAL
1	15	Student Lab Tables	100.00	1,500.00
2	6	3M Sound-on-Slide Projectors	300.00	1,800.00
3	6	Sony Video Tape Viewers	150.00	900.00
4	2	Sony Video Tape Recorders	1,000.00	2,000.00
5	6	Dicisumma Calculators	500.00	3,000.00
6	15	Radiant Carrel Vision Model 4000	275.00	4,125.00
7	1	Demonstration Table		1,000.00
8	8	Overhead Projectors Bell & Howell Model 362	180.00	1,440.00
9	1	Large Tilting Screen 70 x 70	150.00	150.00
10	2	16mm Projectors Bell & Howell Model 552T	680.00	1,360.00
11	1	22' T.V. Monitor Admiral	250.00	250.00
12	1	Olivette 702 Computer		1,200.00
13	5	Wang Digital Counters & Computers	600.00	3,000.00
14	1	Desk	300.00	300.00
15	2	Files	100.00	200.00
16	1	IBM Selective Typewriter Long Size		1,000.00
17	1	Transparency Equipment		1,500.00

INITIAL BUDGET FOR THE MATHEMATICS LEARNING CENTER CONTINUED

ITEM	QTY	DESCRIPTION	UNIT	TOTAL
18	2	Duplicating Machines	500.00	1,000.00
19	6	Wollensak Cassette Recorders 2520	185.00	1,110.00
20	2	IBM Dictating	200.00	400.00
21	1	IBM Portable Dictating Machine	150.00	150.00
22	2	Kodak 850 Carousel Slide Projectors	140.00	280.00
23	3	Filmstrip Projectors Model 745C	140.00	420.00
24	1	Multi-Speed Phonograph		300.00
25	2	Welch Auto-tutor	1,500.00	1,500.00
26	2	Mast Teaching Machines	150.00	300.00
27	6	Super 8mm Motion Picture Projectors	200.00	1,200.00
28	1	Supply Budget		8,000.00

TOTAL ------------------------------$39,385.00

The Human Relations Performance Curriculum: A Commitment to Intentionality

Can a behavioral objectives curriculum in human relations permit and encourage an individual to engage in free choice? The behavioral posture is generally associated with prediction and control of behavior. Relatively little consideration has been given to the direction of the powerful techniques of behavioral control. This paper describes a curriculum in human relations, written from a behavioral frame of reference, whose primary objective is the development of teachers who can act freely and spontaneously - with intentionality.

The teacher who acts with intentionality has the tools to generate alternate world views, to "come at" a problem from different vantage points or theoretical views. He readily grasps and considers alternate views of himself and others. In the process of interacting with his environment or with others, the teacher constantly acts... and this action may be manifested by passive involvement, with mutuality, or by direct action. The intentional teacher is not bound to one course of action, but can move "in the moment" to respond and act.

Intentionality is best described behaviorally through the passive or active behavior of teachers. The following example illustrates what happens when a teacher acts with intentionality:

> Susie had a beautiful lesson in human relations. She wanted to share with her fifth grade students some of her ideas about listening to others. She sat on the floor and asked the children to play gossip... to pass a message around the circle by whispering.
>
> After the circle had gone around a few times, Susie asked the children to discuss what had happened. The children engaged in an excellent discussion of how one learns from listening to others. The children continued the discussion on their own and Susie became a participant with them as they explored the topic. As the children became more involved, Susie dropped out of the discussion and became an interested listener. She was particularly pleased when Craig, usually a negative discipline problem, pointed out that "listening is not necessarily hearing."

Susie, in this brief example, illustrates several alternative behaviors with these children. She did not hesitate to decide what she wanted the students to learn in general and provided a framework for this learning process. She, however, immediately moved from teacher to co-participant in the game and discussion. As the children increasingly showed growth, she moved back allowing them to carry the discussion. After this topic was completed, she was prepared to offer the students another suggestion for learning, if another suggestion seemed appropriate at the moment. Important in this discussion is that Susie planned only some of her specific behaviors; she did what "felt right" to her at the moment and that included some planning ahead as well as some spontaneous activity. Not only did she affect children, but they affected her. Susie's experience from this lesson was one of accomplishment.

Jane, on the other hand, illustrates what happens when a teacher fails to act with intentionality:

> Jane, too, had a good lesson plan in which she hoped to teach her sixth graders decision making skills. She presented the children with a situation in which they were to imagine that someone bigger than they wanted to take their bike away from them. She wanted her students to generate as many alternative courses of action as possible in a brainstorming session.
>
> Bill came out with a statement stealing Jane's thunder by listing six alternatives in his first statement. Jane grimaced as Bill had a way of answering questions so completely that he tended to shut others out. The other children sat during the brief hiatus. Jane said, somewhat weakly, "That's fine, now what other ideas can you think of." No one else thought of any other ideas. Jane started talking and showing the children some other alternatives...they weren't listening. The lesson ended when Jane had to reprimand Tom for hitting Bill.

Talking with Jane afterwards revealed that she had felt beaten, almost depressed, when Bill answered her question so completely. Her attention left the children and she had thought about what could she do next. She recalled talking and giving some additional suggestions to the children as to alternatives, but she said inside she was bored with what she was saying and angry at Bill for causing her to lose control of the class. In this situation Jane acted with intentionality when she thought of a good lesson plan. However, when it did not go as she anticipated, she lost intentionality and became encumbered by the situation. In this setting she neither affected nor was affected by her students. One possible example of intentional teaching would have been for Jane to shift her entire lesson to a new framework. She could have had the children role play the various approaches suggested by Bill and have the children evaluate the alternatives. In all liklihood, the children would start generating additional alternatives. With this approach, the teacher would maintain her sense of intentionality and Bill and his classmates would have their own opportunity to experience intentionality. It should be mentioned, however, that when Jane saw her lesson wasn't going well, she forced herself out of her bad feelings toward herself and acted by having the students move to a new area of exploration which went well. In moving out successfully from a difficult situation, Jane exhibited one of the highest forms of intentionality.

We do not believe that intentional teaching can really be defined, except possibly after the fact. The effective teacher who acts with intentionality is constantly mixing thinking and feeling approaches with children in new and unusual ways to maintain her and the children's interest and involvement.

If such teaching can be defined only after the fact, what relevance does teacher training, and especially a behavioral objectives approach, have to the development of the intentional teacher? We believe that one must turn to an examination of two seemingly contradictory approaches to a world view of man for one avenue[1] to teach intentionality... Zen and behaviorism.

Zen, Behaviorism, and Intentionality. Aldous Huxley (1966) has examined the comparative philosophies of East and West.

> ....whereas Western philosophy tends to be concerned with the manipulation of abstract symbols for the benefit of the speculative and moralizing intellect, Oriental philosophy is almost always essentially operational. "Perform such and such psychophysical operations," the exponents of this philosophy say, "and you will probably find yourself in a state of mind which, like all those who have achieved it in the past, you will regard as self-evidently and supremely valuable." ...In this philosophy it is the experiential element that is important. Its speculative super-structure is a thing of words, and words, though useful and necessary should never be taken too seriously. (p. 49-50)

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[1] It seems important to stress at this time that the performance curriculum and philosophic view presented here is only one avenue toward helping teachers and students grow. It is an avenue and a commitment in which we deeply believe. But at the same time, we also believe there are many other alternative routes by which the intentional human being may evolve.

Huxley suggests that we have done a good job of educating the verbal and intellective senses in man, but have neglected the "non-verbal humanities." He considers the possibility of educating students to use their imagination through fantasy training, to learn how to enjoy the sky or a green blade of grass, to control pain, to develop the "art of watching and receiving." He suggests that "systematic training of perception should be an essential element in all education." The philosophy of Zen and the methods of Huxley are closely in agreement with those of the concept of intentionality presented earlier.

An opposite view is presented by Skinner (1953) who believes that behavior is a dependent variable. According to Skinner we behave in response to our environment, our past conditioning... or in more different terms we respond and act according to our past experience.

> If we are to use the methods of science in the field of human affairs, we must assume that behavior is lawful and determined. We must expect to discover what a man does is the result of specifiable conditions and that once these conditions have been discovered, we can anticipate and to some extent determine his actions. (p. 6)

It may be observed that Skinner assumes rather than states that behavior is lawful and determined.

Skinner (1968) has also spoken to the educational community. He too believes that instructional techniques have not been used effectively for human growth. Where Huxley speaks of the use of systematic methods to teach self-control, Skinner tends to speak of using operant methods to control individuals' behavior for their own and others' benefit. To most, the Skinnerian view of man is not a comfortable one. The jargon of operant psychology (condition, reinforce, manipulate, control) is not compatible with the world views of many educators.

May (1969), one of the leading existential psychologists, however, has pointed out that for an individual to act with intentionality, he must assume the behaviorist posture. "That one is free to act when he is allied to a determinism is one of the paradoxes of our problem." The concept of intentionality as developed by May would seem to imply that to achieve enlightment or self-control requires a disciplined commitment to action. Both Zen and behavioral positions demand that one act. It is not possible to resolve the question as to whether or not man is free in this paper; however, both the humanist and behaviorist agree that the illusion that man is free and can act is an important dimension of joyful living. They would tend to disagree, however, on whether freedom is an illusion or a fact. Regardless, the actions of the humanist or behaviorist will appear much the same.

There are some important points of contact between Zen and behavioral approaches: 1) Both operate in a probabilistic fashion. Well defined and rigorous procedures are used to produce behavior changes in the other by the master or by the programmer. 2) May and the existentialists point out clearly that the seemingly antithetical positions of Zen and behaviorism result in the same type of action. The "enlightened" behaviorist seeking to train and condition his subject in self-control procedures behaves in much the same way as the Zen master. 3) Both Zen and behaviorism have adherents who are capable of using their techniques to produce mindless followers rather than independent self-directed individuals.

It is now possible to define more precisely the concepts which establish the relationahip between Zen thought and behaviorism. Both clearly proceed from specific and differing world views and differ most profoundly on the issue of man's spirituality. However, both argue that man's place on earth is purposeful, finite, and predictable. In the Koan, the Zen master manipulates his pupil with the purpose in mind of having his pupil establish complete and utter control over his own physical and thought processes so that in fact the student develops a system of self-manipulation. In operant approaches, the programmer or teacher is also interested in establishing a behavioral repertoire that is first learned, and then controlled by the trainee at his own discretion. Clearly, Zen doctrine or behaviorist dogma can be perverted into behavioral control of others. It is at the juncture of choice as to direction of behavior change that the existential concept of intentionality comes forth to provide guidelines within which to move. Change only stems from commitment to change, either passive or active, by that individual, be he either the Zen student or the behaviorist's trainee.

A Commitment to Action. Giving our philosophical position and our commitment to the development of the intentional teacher, it appeared necessary to establish a program which would provide an opportunity for personal growth in human relations. This program must be structured in its early stages so that the individual has something against which he can interact. In its later stages, the program must be organized so that students can utilize constructs in their own unique fashion and eventually develop their unique own world view and own teaching style.

The basic model adapted for the performance curriculum was an "each one, teach one" approach in which a relatively specific area of human relations behavior is identified (e.g. relaxation, attending behavior, non-verbal communication). The teacher trainees then are informed that they will follow three basic steps: 1) they will learn the skills in the specific area; 2) they will teach or share the skills with one other individual; 3) they will share the skills they have learned with actual students (in the case of our recently completed pilot project, elementary school students). It may be observed that the skills are organized in a hierarchical fashion and that the student teacher does not proceed to the next higher level in the hierarchy until he has demonstrated his ability to perform at the present level.

Now, this model appears such that it would be anticipated that student teachers would be merely "aping" their facilitators and simply be using exactly the same technique and methods they were "taught". This was neither the intent nor the actuality of the performance curriculum. At first level, the teacher trainee was exposed to several alternative views of, for example, relaxation training and its possible relevance to classroom learning. The students were encouraged to discover the method or methods they liked best and to try these same methods at stage two of the curriculum. When they reported back on how successful they had been in teaching relaxation to someone else, the facilitators rewarded most highly those efforts of the trainee which were unique and those which most clearly "belonged" to the trainee rather than those which came from the facilitators. In preparing relaxation lessons to teach to elementary students in a microteaching situation, we encouraged teacher trainees to develop their own approach in teaching these skills to children.

The success of this individual approach was manifested clearly during the first week when no two teacher trainees used the same approach in teaching their microteaching sessions.[2] The sessions ranged from adaptations of the facilitator's method to completely unique methods such as group fantasy, children's games requiring relaxation for success, to breathing exercises of the teacher trainees' own design. Particularly fascinating was the confidence of the trainees before their first session. A secretary who had seen many student teachers about to teach their first lesson (and who did not know the nature of the skill being taught) commented, "I have never seen microteaching students so relaxed."

As the program continued the trainees increasingly realized that their own ideas and methods were the most important and moved more toward developing their own approaches to the teaching process.[3]

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[2] It should be observed that microteaching followed the usual procedures of Allen (1967) as it was first outlined to the teacher trainees. However, each trainee was encouraged to use the microteaching hour in his or her own style. Some trainees used the typical teach-feedback-reteach model, but increasingly they developed their own models for microteaching and feedback. Some went so far as to ask students for feedback and at the other extreme one student elected to eliminate television and simply taught the students a single concept for one hour.

[3] The teaching hierarchies have been so organized that the teacher trainee once having completed the hierarchy is capable of leading a new trainee through the hierarchy under supervision. Presently, able students from the human relations program are recruited as peer teachers for the program. In this type of program, the professor becomes a facilitator and consultant to those actually running the program.

The human relations hierarchies have been in addition to the structural conception of "each one-teach one," developed so that individual students can select alternate instructional routes to the specified behavioral objective. In relaxation, for example, the teacher trainees could join in a group relaxation session, an individual training unit, take an audiotape cassette containing a recording series of relaxation exercises to their room, or simply read materials on relaxation. When trainees felt they had accomplished the objectives at one stage of the hierarchy they would come to their facilitator and demonstrate their ability to relax. As they moved along the eight point hierarchy, each student had the opportunity to proceed at his own rate.

Eventually, the performance curriculum will be designed so that the trainee with some skills will not have to go through the entire curriculum, but start at his present ability to perform. If a student can demonstrate all the skills of a hierarchy, he can move on to other hierarchies or areas of training. This is a performance curriculum and is not time-bound. Finally, each hierarchy has as its final step the requirement that the student evaluate the hierarchy just completed and suggest changes or modification.

In summary, it may be seen that the prime commitment to action within the performance curriculum is a constant effort to permit and encourage the teacher trainee to strike off in his own direction and operate independently from the trainer. If the teacher is to act with intentionality, this very movement must be spontaneous and genuine. In effect, the trainee must produce his own "self-growth".

To promote self-growth and self-direction, the facilitator must emulate the characteristics of intentionality himself. Examples of non-facilitative work include such behaviors as telling the student what to do in a microteaching session, indicating to a student that there is one way which is more right than others, and being so "perfect" that the trainee cannot reach the facilitator at an emotional or intellectual level. An example of positive facilitator behavior would be a statement indicating that the student is free to do whatever he wishes in a microteaching situation as long as he somehow relates his action to the specific behavioral hierarchy in question. The positive facilitator indicates several alternative routes for sharing or teaching a behavioral skill to others, and encourages and rewards suggestions of additional alternatives by the trainee. An example of this occured constantly in all sessions throughout the program and many of the trainee's suggestions regarding the hierarchies were and are being incorporated into the hierarchy design.

The effective facilitator operates spontaneously and of the moment. While he might have a general plan and an objective to accomplish, he is flexible and able to change his approach teaching his concepts as the needs of his students indicate. This modeling of intentionality on the part of the facilitator may be one of the most important aspects of the entire performance curriculum. The facilitator who only teaches will have difficulty in the performance curriculum. An effective facilitator must also share with his students in a mutual manner and be able to learn from them.[4]

Intentionality, then, is made manifest in all aspects of the "each one-teach one" model. A facilitator commits himself to a general course of action, but feels free to modify his behavior spontaneously as new inputs arise from the environment. The student trainees learn that they have power over their own experience with the facilitator as they see themselves causing the facilitator to modify his behavior.

The Performance Curriculum: A Structure for Intentionality. Skinner (1968) has observed that "behavioral processes, such as learning, discriminating, generalizing, and abstracting...are not singular behavior, but changes in behavior." Skinner does not believe it necessary to teach generalization for example, but it may suffice simply to teach the behaviors which lead a person to make abstractions or generalizations. The abstraction or generalization sought in the performance curriculum is that of intentionality. The performance curriculum with its emphasis on relatively specific behaviors consist of many parts, but each part simply views man from a different perspective.

Thus hierarchies established in such seemingly diverse areas as relaxation training and decision making, non-verbal and verbal communication, and attending behavior all have a common objective...that of providing the teacher trainee with a variety of behaviors or actions which he can apply in his own unique fashion in his own unique situation. "Each one-teach one" hierarchies have been developed in over 30 areas. They range from self-control to psysiological response to listening skills and empathy to organizational change. In each case the individual must find his own definition of the behavior in question if he is to achieve the central objective of intentionality inherent within the program.

Perhaps the best way to describe how the performance curriculum works in actual operation is to outline in detail one of the hierarchies and our personal experience as we shared our ideas with our students and learned from them. Following is the complete text of the performance hierarchy on attending behavior.

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[4] While not stressed in this discussion, student teachers were encouraged to teach their elementary students beginning concepts of intentionality and self-direction. The successful lesson of Susie illustrated earlier in this paper not only represented Susie but also her students operating with intentionality.

HIERARCHY III

(Attending Behavior)

Performance Criterion	Instructional Alternatives
1. The teacher trainee will relax to the satisfaction of the facilitator.[5] *Move on to next step.	a. Use Davison's tapes to relax. b. Use Gunther's system to relax.
2. The teacher trainee will practice eye contact, attentive posture and verbal following with fellow trainees and others. Intermix non-attending and attending behaviors and record any differences in communication. This will be done to the satisfaction of the facilitator. *Proceed to next step.	a. The teacher trainee will practice eye contact, attentive posture and verbal following in a micro-counseling situation with videotape feedback. b. The teacher trainee will participate in a group exploring alternative behavior.
3. The teacher trainee will observe groups of children for 5,4 3,2, and 1 minutes successively. Write a description of the children's attending behavior to the satisfaction of the facilitator. *Move on to next step.	a. The teacher trainee will view Al Ivey's video tape on Attending Behavior. b. The teacher trainee will prepare a checklist of the components of attending behavior as a group project.

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[5] It should be clear at this point that the criterion "to the satisfaction of the facilitator" means that the student trainee should define his own method and style of performance. However, this does not mean abdication of responsibility on the part of the facilitator. The facilitator looks to see whether or not the trainee can develop his own methods of teaching the concept in question. He examines teaching materials developed by the trainee and observes the trainee teaching human relations sessions. The ultimate performance criterion for a major hierarchy such as this is the number and quality of instructional alternatives the teacher can generate himself to teach the concept in question.

(HIERARCHY III, Continued)

Performance Criterion	Instructional Alternatives
4. The teacher trainee will establish a program for teaching attending behavior to the satisfaction of the facilitator. *Move on to next step.	a. The teacher trainee will practice attending behavior skills with the trainer. b. The teacher trainee will prepare a self-evaluation in relation to his own attending behavior skills. Use the group's feedback as a criteria for the evaluation.
5. The teacher trainee will teach one person attending behavior to the satisfaction of the facilitator. *Move on to next step.	a. The teacher trainee will develop a scale for rating the child's attending behavior. b. The teacher trainee will in a group evaluate his teaching approach.
6. The teacher trainee will teach in a micro-teaching setting, some aspect of attending behavior to the satisfaction of the facilitator. *Move on to next step.	a. The teacher trainee will list his own attending behavior skills and evaluate them. b. The teacher trainee will evaluate the progress of each trainee in acquiring attending behavior skills.
7. The teacher trainee will form a group of fellow trainees in which they will discuss the issues that relate to attending behavior. The trainee will also provide a critique of this in writing with suggestions. *Stop.	a. No instructional alternative planned.

As a first stage in all performance hierarchies, the teacher trainee was requested to "tune in to himself" via some form of relaxation exercise. A basic philosophy of the entire program was that the teachers should not act until they are in touch with themselves as persons. While we do not expect nor wish teachers to deliberately relax physically in every situation, we are interested in giving the teachers the ability to control their body and physiological responses if they so wish. This is in the belief that a relaxed and natural teacher is an important prerequisite to effective teaching and interpersonal relations. The relaxation hierarchy has proven to be our most popular series of exercises with our trainees.

Step two of the hierarchy requires a somewhat detailed explanation. While most would agree that listening is an important skill and we somehow know when someone is or is not listening to us, few can identify the component parts of listening. Ivey, Normington, Miller, Morrill, and Haase (1968) have explored the concept of attending behavior, which, while not equivalent to the construct listening, does contain specific elements of this broader concept. Attending behavior is taught through a videotape feedback technique termed micro-counseling--a method similar to microteaching except that interpersonal interaction skills are stressed as compared to teaching skills.

Attending behavior is defined as: (1) maintain eye contact with the other person; (2) physical attiveness in terms of an attending, yet relaxed posture and gestures; and (3) verbal attention in which the individual simply attends to the other person's conversation and does not introject any new information of his own, except his understanding of what the other has said. These specific behaviors can be taught by a variety of instructional routes relatively quickly and efficiently.

Some might accept attending behavior as a definition of listening. We do not. We do not believe listening truly occurs unless the person who is attending forgets his deliberate behavioral acts and at some point finds himself attending naturally without being aware of the behaviors he first engaged in artificially.

How does one forget deliberate behaviors and move from an attender to a listener? The concept of tacit knowing is used by Polanyi (1960) to summarize activities we engage in without thinking of details. When one swings a golf club well, sings a song beautifully or dances a difficult ballet, there is tacit knowledge of what is done in terms of all the specific details of behavior necessary to perform those complex acts. However, if the golfer, singer or ballet dancer thought in detail of all the actions or specific behaviors he has engaged in, the quality of action would not be possible. Many specific and highly trained behaviors have been merged into one action. Most would agree that the quality of the large action is greater than the sum of its behavioral components. The individual has somehow uniquely blended these parts into a new combination.

Similarly, the attender who becomes a listener has blended the components of attending behavior into something greater. Perhaps this is best illustrated by a shy student whom we taught attending who afterwards found that it was easier for him to talk to people and that others somehow considered him a more interesting person. He commented, "I begin attending artifically, but soon I get so interested that I forget about what I'm doing and move into natural participation."

This, then, is an essential method of the program in human relations training. A target behavior is identified (and it may be as broad as leadership or as specific as physical relaxation), the specific behavioral components of that target behavior are analyzed, identified, and placed into a teaching hierarchy in the belief that teaching specific behavioral skills can and will lead to human relations behaviors equal to or beyond the original target behavior.

While the bulk of the training in attending behavior centered on micro-counseling approaches, key to the success of this hierarchy was a group session in which the facilitators presented a wide variety of alternatives for viewing attending behavior. Memory games, noticing one's environment, meditation, the relationship of details to large gestalts are some examples of cognitive and experiential material from this session. Emphasis was placed on the fact that there are a wide variety of methods for teaching attending.

The success of the method was illustrated at step six of the hierarchy. Susie's lesson described earlier was one of the trainee sessions designed to teach attending behavior. One trainee used the micro-counseling framework itself with the children, with surprising success, another developed a game using art materials which required the students to listen to one another before proceeding with their picture, one turned off the lights and had the students tell Halloween stories, and still another deliberately planned no specific lesson to determine if she could respond at the moment...the session which evolved consisted of her telling something about herself and having the elementary students ask her questions for more elaboration. Then, in turn, all the students had the opportunity to share something with the group and then have questions asked of them. Some of the teacher trainees had an excellent discussion of listening concepts with the children, others preferred to operate purely at an experiential level with no deliberate cognitive input.

As the students participated in the hierarchies, they increasingly saw the relationship of each hierarchy to the other. For example, Susie's game of gossip, while designed to teach attending behavior and listening skills, could have been used to teach relaxation, decision making, and even non-verbal skills. Susie could have asked the students to make their muscles very tense and then start the gossip circle. The group then could have explored the importance of relaxation in relation to hearing what others have to say and perhaps even extended the concept to subject matter areas. Decision making could be taught in this framework. For example, Susie could have asked them to pass around a lengthy series of nonsense symbols, then some relatively uninteresting facts from history, and then an interesting "Peanuts" joke. The students could discuss distortions in the various types of materials and how they must make decisions through their listening as to how accurately they chose to pass information on to each other. In each case, the underlying concepts of intentionality could still be taught. In later sessions, if the students did not seem to be responding to attending and listening constructs, Susie has the ability to switch the lesson to another framework more suitable to the immediate needs and interests of the students...if things did not go well, she need not compromise herself, but can utilize many frameworks to help the students grow.

Thus, while specific behaviors are taught within the performance curriculum, the emphasis is always on the generation of new and alternative behaviors, situational in context and appropriate to the present interaction. The behavioral approach has been used to provide tools for the intentional teacher who is now free to act on his own volition.

The Intentional Teacher. The intentional teacher is a person who can understand himself and others in a multitude of contexts and situations. The performance curriculum in human relations simply provides a set of experiences which broaden the behavioral options open to the teacher.

A general performance criterion for the intentional teacher has been defined:

> Upon successful completion of an individually selected program of verbal and non-verbal awareness training, the teacher trainee will be more fully aware of the relationships of body to mind, of himself to others, and of himself to his environment. He will be able to integrate activities to further these same processes into the regular classroom and will also be able to use these same activities to make himself a more complete, comfortable, and productive person.

Human relations is usually thought of as behaviors in relation to others. We have chosen, however, to include behaviors in relation to self (relaxation, physical development, thinking, self-evaluation) as within the realm of human relations activity. Unless one views himself positively and has some degree of self-confidence and understanding, there is little liklihood of intentionality.

The fully functioning individual must be able to understand and work with others in a variety of social settings. He should be able to function in two person relations, small groups, classrooms, and in complex organizations. A detailed performance curriculum to provide teachers with experiences in these settings has been developed. While activities vary within each area of emphasis, a five step structural approach has been suggested for the four areas of human interaction:

Step 1: The teacher trainee demonstrates his ability to follow directions of the other person in the dyad, the group, his students in the classroom, or the organization.

Step 2: The teacher trainee demonstrates his ability to share and express his ideas and feelings in each setting.

Step 3: The teacher trainee demonstrates his ability to work with others on a mutual basis through solving a problem together.

Step 4: The teacher trainee will demonstrate his ability to lead a dyadic interaction in one direction, a small group to a decision, a classroom to solving a problem, and also demonstrate his ability to institute organizational change.

Step 5: The teacher trainee will demonstrate his ability to follow directions, share his ideas and feelings, work mutually, and take leadership interchangeably in the four contexts.

It may be observed that the five steps defined for interpersonal functioning could be defined as a set of additional skills which should be available to the intentional teacher. We believe the intentional teacher is an individual who can be in tune with himself at a particular moment, listen carefully to a child, help a small group resolve a problem, institute an organizational change, or, perhaps, even decide not to act at all. All behavioral options ideally are open to the intentional teacher. As this type of person does not exist in the fullest dimension, the opportunity to fail and be truly human is an important option available to the intentional teacher.

The intentional teacher, then, is an individual who can be in contact with himself and others, can act at will and can allow himself to be acted upon... he has the freedom to fail... and to succeed.

FEASIBILITY STUDY

Goals of the Performance Curriculum in Human Relations.[6] The intentional teacher has been defined in our philosophical statement as the central goal of the performance curriculum in human relations. The general performance criterion for the intentional teacher was defined as:

> Upon successful completion of an individually selected program of verbal and non-verbal awareness training, the teacher trainee will be more fully aware of the relationships of body to mind, of himself to others, and of himself to his environment. He will be able to integrate activities to project these same processes into the regular classroom and will also be able to use these same activities to make himself a more complete, comfortable, and productive person.

How does one test these ambitious goals? Can they be made operational? It would seem obvious that to test the objectives stated above demands massive involvement and preparations. Also, only a five week period was available to test a curriculum that potentially could cover three semesters equivalent of undergraduate work. Clearly, compromises had to be made. The following limitations and parameters were established for the preliminary feasibility testing of the performance curriculum in human relations:

1. Only a small group of students would be trained. This group would receive intensive training over a variety of instructional alternatives.

2. Only four areas (relaxation, non-verbal communication, attending behavior, and decision process) would be taught. One week was to be spent in each area. The original performance curriculum (Ivey, 1968) has approximately 50 possible areas for training.

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[6] All evaluations here are early and somewhat incomplete. Stephen Rollin is utilizing this data for his doctoral thesis and a copy of his thesis will be forwarded wherein all evaluation data will be reported with much more detail and justification.

3. The general objective of the performance curriculum has been outlined above. It is not truly possible to test this general objective except through indices of the general objective. Thus, questionnaires, estimates made by the facilitators, observations of videotapes of specific teacher trainee behaviors, course evaluations, etc. have been used as they at least sample some of the aspects of the general objective. We recognize there are many ways to evaluate the effectiveness of the performance curriculum and the evaluation methods used here have proved to be of mixed effecitveness. Nonetheless, we are also convinced that the success of a behavioral objectives approach to human relations can be evaluated and the experience in the four week testing has lead to many alternatives for examination in the future.

A multi-channel evaluation procedure was developed to test the objectives of the human relations performance curriculum. A comparison group of teacher trainees was selected so that differences could be examined between those who experienced the curriculum and those who did not. The specific evaluation plan with accompanying goals and a summary of general findings is as follows:

1. Self-concept testing.
   It was predicted that those students who participated in the performance curriculum would have improved self-concept scores on the Miskimins Self-Goal-Other self-concept instrument.

   The major finding was that the trainee group over the four week period had significantly greater correspondence between self-concept and ideal self-concept. The non-trainee group showed no change in self-concept. The level of significance was at the .001 level.

2. Relaxation.
   It was predicted that the trainees would rate the concept My Ability to Relax on a semantic differential scale more positively than non-trainees.

   It was predicted that the trainees would score fewer errors on a delayed auditory feedback test. (Data from a recent study by Rudman, 1969, indicated that the D.A.F. might be a suitable instrument to test the ability of individuals to relax.)

   The trainees rated themselves as improved on their ability to relax while the comparison group showed no change. The level of significance was at the .001 level. No difference between groups on the D.A.F. test was found. Viewing the data post hoc (always a dangerous procedure), we now believe that our decision to use this particular test was inappropriate. We found the D.A.F. a highly reactive measure due to practice effect. In the second session with the D.A.F., all participants reduced their errors by over 50%.

3. Non-verbal communication.
   It was predicted that the trainees would rate the concept My Ability to Communicate Non-verbally on a semantic differential scale more positively than non-trainees.

   It was predicted that trainees would be rated as more effective non-verbal communicators in a standard videotaped situation than non-trainees.

   The trainees rated themselves as significantly improved in their ability to relax while the comparison group showed no change. The level of significance was at the .004 level.

   The videotape ratings of non-verbal communication are currently being completed and will be submitted at a later point as an addendum to this report.

4. Attending behavior.
   It was predicted that the trainees would rate the concept My Ability to Listen on a semantic differential scale more positively than non-trainees.

   It was predicted that the trainees would be rated as more effective listeners in a standard videotaped situation than non-traineers.

   The trainees rated themselves as significantly improved in their ability to listen while the comparison group showed no change. The level of significance was at the .001 level.

   The videotape ratings of attending behavior are currently being completed and will be submitted at a later point as an addendum to this report.

5. Decision making.
   It was predicted that the trainees would rate the concept My Ability to Make Decisions on a semantic differential scale more positively than non-trainees.

   It was predicted that the trainees would score more highly on a decision making test, producing more alternatives than non-trainees.

   The trainees rated themselves as significantly improved in their ability to make decisions while the comparison group showed no change. The level of significance was at the .001 level.

6. Curriculum development.
   It was predicted that the trainees would develop a more effective imaginative lesson plan for teaching a lesson in racial relations than non-trainees.

   It was found that trainees were able to develop more effective curriculum units in racial relations than non-trainees.

7. Course evaluation.
   An extensive evaluation form was distributed to the trainees who were given the opportunity to evaluate their experience in depth. This form asked tarinees to summarize their impressions of the performance curriculum, indicate their preference for instructional alternatives, indicate how much time the total curriculum took them, and suggest changes for the total program.

   The course evaluation instrument revealed that the curriculum had been exceptionally well received. For example, when asked how valuable the course was in relation to other courses in the university on a five point scale, the mean score was 4.9 with 5.0 representing the statement "considerable more value." The most popular hierarchy was the one on relaxation training.

Early evidence is that: 1) trainees demonstrated more congruent self-concepts than non-trainees; 2) trainees rated themselves as more competent in the four skill areas on the semantic differential scales; 3) the delayed auditory feedback test failed to reveal differences between the groups; 4) the trainee group revealed the ability to develop more and better alternatives on a written test on decision making; 5) the trainee group was able to develop a more highly rated curriculum unit in racial relations than non-trainees; 6) the trainees enjoyed the course and felt it was of "considerable more value" than other courses they had taken in the university or the School of Education. Possible limitations of these data are discussed in Section IV.

The essential finding of the data could be summed up in the brief statement, "The curriculum worked, there is evidence of behavioral changes, the students enjoyed it, the facilitators enjoyed it, it is a feasible method of teaching human relations."

Description of Performance Criteria and Instructional Alternatives. Four hierarchies of performance criteria were selected as representative of over 30 available hierarchies. Each hierarchy consisted of seven to nine steps organized basically around the pattern indentified in the student handbook for the course as:

1. You will learn the skills in this area. (e.g. In nonverbal communication, the individual learns a variety of new skills.)
2. You will teach some of these skills to someone else.

3. You will teach some of these skills to elementary students.

As such, instructional alternatives were designed so that each trainee could develop as many alternative ways of teaching the specific skill in question.

The relaxation hierarchy was established as the basic training unit as it is believed that unless a teacher is somewhat relaxed and in tune with himself, he will be unable to reach out and affect children in a positive manner. While training centered on two basic methods of relaxation, stress was placed on many alternatives for teaching relaxation to others. Teacher trainees were supported in their effort to find new and innovative ways to teach concepts of relaxation.

The non-verbal hierarchy included many "Esalen-type" exercises all focused on making the teacher trainee more aware of the nature of non-verbal aspects in their own personal life and in the classroom.

Attending behavior stressed the need for listening to others. Teacher trainees were encouraged to develop many alternative approaches to teaching listening skills and an unusual number of mehtods to teach listening were presented.

Design and Implementation of Pedagogical Feasibility Study. Subjects: Twenty-four students were selected at random from a larger sample of 54 volunteers for participation in the human relations curriculum. These in turn were divided into an experimental and a comparison group. One of the twelve students in the experimental group dropped out of school during the first week of the performance curriculum. As the pre and post testing was conducted on a weekly basis, there was the usual loss of subjects due to missed appointments, illnes, etc. Therefore, study results will reveal varying numbers of subjects for each test. Training: The training model experienced by the trainees was described in general form in the summary philosophical statement and in specific form in Description of the Performance Criteria and Instructional Alternatives.

The schedule of events for the entire study was as follows:

October 2	Pretesting on self-concept instrument, semantic differential for relaxation, and delayed auditory feedback.
October 5 - 10	Training - Physical Awareness
October 10	Post-testing on semantic differential for relaxation and delayed auditory feedback. Pre-testing on non-verbal communication semantic differential and videotaping of first non-verbal session. (The students were instructed to communicate with another individual

	non-verbally for three minutes.)
October 13 - 17	Training - Non-verbal Communication
October 17	Post-testing on non-verbal communication semantic differential and videotape of second non-verbal communication experience. Pre-testing on attending behavior semantic differential and videotape of session in which each participant was instructed to interview the other.
October 20 - 24	Training - Attending Behavior
October 24	Post-testing on attending behavior semantic differential and videotape on attending behavior. Pre-testing on decision making semantic differential and decision making test.
October 28 - 31	Training - Decision Making
October 31	Post-testing and decision making semantic differential and decision making test. Post-testing and decision making semantic differential and self-concept test. Administration of racial relations curriculum development test. Administration of course evaluation form.

The decision making hierarchy is based on a model which requires that the student: 1) develop alternative definitions of what the problem actually is; 2) develop alternative strategies for each definition; 3) develop alternative contingencies or expectancies for the effect each alternative might have on other individuals or the environment.

Following are the complete "Introduction to Human Relations Hierarchy" and the "Supplementary Student Handbook." Herein are relatively detailed descriptions of each performance criterion and the main instructional alternatives utilized by the staff. It should be observed that one hierarchy was taught per week. About 15 hours per week were spent in training sessions with the students and an additional 5.3 hours were spent in outside preparation by the students in the program.

METEP

Introduction to the Human Relations Hierarchy

It is the purpose of this program to aid you the elementary school teacher trainee in developing and honing certain skills that are felt will be of great service to you as both teacher and laymen. These hierarchies will help you develop skills in:

1. Physical awareness
2. Non-verbal awareness
3. Attending behavior
4. Decision making
5. Sexual awareness
6. Racial awareness

These hierarchies should be approached individually and in order. It is most important to maintain the order that they are presented in on the printed forms.

As you proceed you will notice the page divided into three columns. In the first column you will find some reference material for each hierarchy. You are to read the sections of the reference material - the instructional aids - that you feel are most useful and pertinent. You need not read any of the reference material in its entirety unless you feel you would like to at the time. Many of these resources are housed at Wysocki House and the library at the School of Education. The second column contains the program we would like you to follow and the third column contains instructional alternatives that you might find helpful in performing the hierarchy. Please keep track of each event or activity the date you perform it and record your reactions to that event as soon after you complete it as possible.

You will be issued each hierarchy individually and will not be given the next hierarchy until the one you are currently working on has been completed. You are to feel free to request of the trainer or your supervisor any assistance that you feel you need in aiding you in your work through the hierarchy.

The last task you will be asked to do will be to select one or more of the hierarchies and retool or redevelop it to what you might consider to be a more effective approach to the same topic.

HIERARCHY I (Physical Awareness)

Instructional Aids	Performance Criterion	Instructional Alternatives
1-b. Jacobson's Relaxation Techniques	1. The teacher trainee will achieve relaxation to the satisfaction of the trainer. * Do not proceed until you are relaxed.	a. The trainee will achieve relaxation using Davison's tapes. b. The teacher trainee will read Gunther, B. Sensory Awakening and Relaxation.
2-a. Yoga Postures for Self Awareness - Kriyananda 2-a. Gestalt Therapy - Perls, Hefferline and Goodman	2. The teacher trainee will attend to and focus on specific feelings in his body. Attend to both painful and pleasurable sensations. The trainee will report to the trainer on the sensations he has focused on. * Proceed to next step.	a. The teacher trainee will read a section from Joy by W.C. Schutz. b. The teacher trainee will in a group setting practice attending to and reporting body sensations.
3-a. Naked Ape - D. Morris	3. The teacher trainee will share his thoughts generated in PC 2 with four fellow trainees so that these thoughts are clearly understood. * Proceed to next step.	a. The teacher trainee will write his thoughts and share the written thoughts with one other. b. The teacher trainee will record on an audio recorder his thoughts and listen to the recording in a group of fellow trainees.

HIERARCHY I Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
4-a. Gunther, B. _Sensory Awakening and Relaxation_ Iyengar, B.K.S. _Light on Yoga_	4. The teacher trainee will complete a set of physical awareness exercises to the satisfaction of the trainer. * Proceed to next step.	a. The teacher trainee will participate in Esalen type exercises. b. The teacher trainee will do ten exercises described by Lowen (1958).
5-a. _Measurement and Evaluation in Psychology and Education_ Thorndike and Hagan	5. The teacher trainee will teach one other adult a physical awareness skill so that the one being taught can readily perform the skill. * Move on to next step.	a. The teacher trainee will in writing review all past experiences in physical awareness. b. The teacher trainee will review all past experiences in a group of fellow trainees.
	6. The teacher trainee will establish a written program for the teaching of physical awareness and relaxation to the satisfaction of the trainer. * Proceed to next step.	a. The teacher trainee will write a brief review of the literature relating to physical awareness and relaxation. b. The teacher trainee will make a model video tape that could be used for the instructional purposes of teaching physical awareness and relaxation.

HIERARCHY I Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
	7. The teacher trainee will instruct a microteaching class in relaxation and physical awareness using the program just completed. This will be done to the satisfaction of the trainer.	a. The teacher trainee will teach a group of fellow trainees relaxation and physical awareness using the program just developed. b. The trainee will view an instructional film on microteaching.
	8. The teacher trainee will meet with his fellow trainees in a group to discuss the impact, feeling, and new learning that was gained in the completion of this hierarchy. He will also include a written critque and suggestions for improving the hierarchy. * Stop.	a. No instructional alternative.

HIERARCHY II (Non-Verbal Awareness)

Instructional Aids	Performance Criterion	Instructional Alternatives
1-a. Sense Relaxation B. Gunther	1. The teacher trainee will achieve relaxation to the satisfaction of the trainer. * Do not proceed until you are relaxed	a. The trainee will achieve relaxation using Jacobin's system (1938). b. The trainee will relax using the Davison tapes.
2-a. Joy - William Schutz	2. The teacher trainee will demonstrate knowledge of ten non-verbal exercises. * Proceed to next step.	a. The trainee will participate in a two hour group sensory awareness session. b. The trainee will select five exercises in Gestalt Therapy and make a video tape of his activity.
3-a. Way of Zen by Al Watts 3-a. Zen and Intuited Knowledge S. Sakamaki	3. The teacher trainee will spend one full afternoon engaged in quiet meditation with a one page written diary. * Proceed to next step.	a. The teacher trainee will read Walden by Thoureau. b. Trainee will read Yoga Postures for Self-Awareness and establish a program for doing the exercises in a group.

HIERARCHY II Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
4-a. Silent Language E. Hall 4-a. Education on the Non-verbal Level - A. Huxley 4-b. Games People Play - E. Berne	4. The teacher trainee will present a written program to teach non-verbal awareness to the satisfaction of the trainer. * Proceed to next step.	a. The teacher trainee will read Aldous Huxley's article on Non-verbal Communication. b. The teacher trainee will critique a fellow trainee's program for building non-verbal awareness and suggest alternate approaches in a group.
5-a. Micro-Teaching Dwight Allen 5-a. Preparing Instructional Objectives - R. Mager 5-b. Dave Berliner's Film - On Non-Verbal Communication	5. The teacher trainee will teach non-verbal awareness to one other individual so that the other individual possesses non-verbal awareness skills. * Proceed to next step	a. The teacher trainee will describe in a group his program to teach non-verbal awareness. b. The teacher trainee will diagnostically evaluate his own non-verbal skills.
	6. The teacher trainee will teach a 20 minute microteaching class non-verbal skills to the satisfaction of the trainer. * Proceed to next step.	a. The teacher trainee will discuss with the trainer his program of teaching non-verbal awareness. b. The teacher trainee will report in a group the non-verbal skills he possesses and demonstrate those skills.

HIERARCHY II Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
	7. The teacher trainee will meet in a group with his fellow trainees to discuss the impact, feelings and new learning that was gained during the completing of this hierarchy and write a critique of this hierarchy. * Stop.	

HIERARCHY III (Attending Behavior)

Instructional Aids	Performance Criterion	Instructional Alternatives
1-b. Jacobsen's Relaxation Techniques	1. The teacher trainee will relax to the satisfaction of the trainer. * Move on to next step.	a. Use Davison's tapes to relax b. Use Gunther's system to relax.
2-a. Attending Behavior Al Ivey	2. The teacher trainee will practice eye contact, attentive posture and verbal following with fellow trainees and others. Intermix non-attending and attending behaviors and record any differences in communication. This will be done to the satisfaction of the trainer. * Proceed to next step.	a. The teacher trainee will practice eye contact, attentive posture and verbal following in a group situation. b. Observe a video tape of beginning counselor before and after training in attending behavior.
3-a. Hypnosis and Concentration in Study by E.R. Oetting	3. The teacher trainee will watch groups of children for 5, 4, 3, 2, and 1 minutes successively. Write a description of the children's attending behavior to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will view Al Ivey's video tape on Attending Behavior. b. The teacher trainee will prepare a checklist of the components of attending behavior as a group project.

HIERARCHY III Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
4-a. Micro-Teaching Dwight Allen 4-b. Preparing Instructional Objectives - Robert Mager	4. The teacher trainee will establish a program for teaching attending behavior to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will practice attending behavior with the trainer. b. The teacher trainee will prepare a self-evaluation in relation to his own attending behavior skills. Use the group's feedback as a criteria for your evaluation.
	5. The teacher trainee will teach one child attending behavior to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will develop a scale for rating the child's attending behavior. b. The teacher trainee will in a group evaluate his teaching approach.
	6. The teacher trainee will teach a 20 minute class, in a micro-teaching setting, attending behavior to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will list his own attending behavior skills and evaluate them. b. The teacher trainee will evaluate the progress of each trainee in acquiring attending behavior skills.
	7. The teacher trainee will form a group of fellow trainees in which they will discuss the issues that relate to attending behavior. The trainee will also provide a critique of this in writing with suggestions. * Stop	a. No instructional alternatives planned.

HIERARCHY IV (Decision Making)

Instructional Aids	Performance Criterion	Instructional Alternatives
	1. The teacher trainee will achieve relaxation to the satisfaction of the trainer. * Move on to next step.	a. Use Jacobson's system (1938) to achieve relaxation. b. Use Davison's tapes (1968) to achieve relaxation.
2-a. Dwight Allen's film on Decision Making 2-b. Predicament, Problem and Psychology - David Tiedenam	2. The teacher trainee will observe a teacher who is teaching a class and will note the strategies (different behaviors) used by the teacher. The trainee will then suggest alternate strategies to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will practice generating alternate strategies to obtain any behavior in a group of peers. b. The teacher trainee will read Ivey's, A Behavioral Definition of Human Relations.
3-b. On Becoming a Person C. Rogers	3. The teacher trainee will defend the alternate strategies selected in step two as to why they were chosen; to the satisfaction of the group of fellow trainees to whom the presentation is being made. * Move on to next step.	a. The teacher trainee will practice using at least three different approaches to a specific teaching problem he has observed. b. The teacher trainee will read an autobiography of someone who seemed to the trainee to be particularly adept at making decisions.

HIERARCHY IV Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
4-a. The Courage to Be Imperfect - R. Dreiburs 4-a. Creating a Climate For Change - A. Ivey Anger and the Rocking Chair - Janet Lederman	4. The teacher trainee will demonstrate in a group of fellow trainees how he reaches a decision. He will do this to the satisfaction and understanding of members of the group. * Move on to next step.	a. The teacher trainee will observe others making decisions and offer alternative approaches for the resolution of the decision. b. The trainee will analyze and define his own decision making process in writing.
5-a. Micro-Teaching, Dwight Allen 5-b. Preparing Instructional Alternatives - R. Mager	5. The teacher trainee will develop a program to teach, in a micro-teaching setting, decision making skills to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will discuss with his supervisor his program. b. The teacher trainee will discuss in a group of fellow trainees problems arising out of preparation of the instructional program.
	6. The teacher trainee will teach a 20 minute microteaching class decision making skills to the satisfaction of the supervisor. * Move on to next step.	a. The teacher trainee will observe and critique a fellow trainees micro teaching session in a group of fellow trainees. b. The teacher trainee will critique his own presentation in relation to decisions he made before the presentation was made.

HIERARCHY IV Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
	7. The teacher trainee will in a group of fellow trainees discuss, evaluate and suggest alternate approaches to this hierarchy to the group satisfaction. *Stop.	a. No instructional alternative planned.

HIERARCHY V (Sexual Awareness)

Instructional Aids	Performance Criterion	Instructional Alternatives
1-a. *Sense Relaxation* B. Gunther	1. The teacher trainee will achieve relaxation to the satisfaction of the trainer. * Move on to next step.	a. Use Jacobson's system (1938) to achieve relaxation. b. Use Davison's tapes to achieve relaxation.
2-a. *Human Sexual Response* Masters and Johnson 2-a. *Human Sexual Behavior and Sex Education* - W. Johnson	2. The trainee will demonstrate a basic knowledge of sexual facts and terms to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will read *The Art and Science of Love*, A. Ellis. b. The trainee will discuss in a group his attitudes towards sex and sex education.
3-a. *American Sexual Tragedy* A. Ellis 3-a. *Sex and Racism in America* C. Hernton	3. The teacher trainee will demonstrate knowledge of various American cultural attitudes towards sex to the satisfaction of the trainer. * Move onto the next step.	a. The teacher trainee will read *The Sexual Wilderness* by Vance Packard. b. The teacher trainee will examine his own cultural heritage and that heritage attitudes towards sex in a group of fellow trainees.
4-a. Allen, D. *Micro-Teaching* Mager, R. *Preparing Instructional Objectives*	4. The teacher trainee will prepare a program to teach sexual awareness in a micro-teaching setting to the satisfaction of the trainer. * Move on to next step.	a. The trainee will discuss with his supervisor his training program.

HIERARCHY V Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
	5. The trainess will in a group of fellow trainees discuss, evaluate and suggest alternate approaches to this hierarchy to the group satisfaction. * Stop.	

HIERARCHY VI (Race and Ethnic Awareness)

Instructional Aids	Performance Criterion	Instructional Alternatives
1-a. Gunther, B. *Sense Relaxation*	1. The teacher trainee will achieve relaxation to the satisfaction of the trainer. * Move on to next step.	a. Use Davison's tapes to achieve relaxation. b. Use Jacobson's program to achieve relaxation.
2-a. Quarles - *The Negro In the Making of America* 2-a. Myrdal, G. - *An American Dilemna*	2. The teacher trainee will demonstrate knowledge and awareness of American racial and ethnic history. This will be done to the satisfaction of the trainer. * Move on to next step.	a. The trainee will read a text of his selection on ethnic history. b. The trainee will discuss in a group of fellow trainees ethnic and racial history.
3-a. Frasier, E. - *The Black Bourgeoise* 3-b. Attend to advertisements especially	3. The teacher trainee will demonstrate knowledge, by acting out, various ethnic and racial stereotypes that are prevalent in the United States to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will practice in a group racial and ethnic stereotypes. b. The trainee will select from the communication media the use of stereotypes and study them closely.

HIERARCHY VI Continued

Instructional Aids	Performance Criterion	Instructional Alternatives
	4. The teacher trainee will participate in a twelve hour marathon session and share his feelings on race to his own satisfaction. * Move onto next step	a. Trainee will write an autobiography of himself in which he will try and pinpoint his own feelings and attitudes to people of differnet race and/or ethnic origin.
5-a. Allen, D. Micro-Teaching 5-a. Mager, R. Preparing Instructional Alternatives	5. The teacher trainee will develop a program to be used in a micro-teaching class to teach race and ethnic awareness. * Move on to next step.	a. The teacher trainee will discuss his program with his supervisor. b. The teacher trainee will discuss in a group any and all problems arising out of preparation of the program.
6-a. Allen, Dwight - Micro-Teaching 6-a. Mager, Robert - Preparing Instructional Objectives	6. The teacher will teach a 20 minute microteaching class, race relations, to the satisfaction of the trainer. * Move on to next step.	a. The teacher trainee will critique a fellow trainee's microteaching class. b. The teacher trainee will practice his microteaching program in a group of fellow trainees.
	7. The teacher trainee will in a group of fellow trainees discuss, evaluate and suggest changes for their hierarchy. * Stop.	

SUPPLEMENTARY STUDENT HANDBOOK

PERFORMANCE CURRICULUM IN HUMAN RELATIONS

The purpose of this brief handbook is to provide an overall summary of the four week program we plan in human relations training. Basically, this course or set of exercises is based on the premise that effective human relations is one of the most important skills that a teacher can have. In the past, these skills have been thought to be inherent and that training could not affect a teacher's ability to relate with students.

We are not interested in teaching you the correct way to relate with another individual. We do not offer pat formulas or direct answers. Rather, we are interested in developing in you the ability to make your own decisions in regards to others...we also hope that we will show some new alternatives for reaching another human being more effectively. Our basic philosophy could be summed up as one which stresses the importance of the uniqueness of each individual.

We believe the uniqueness of the individual may be expressed most fully and humanly when alternative behaviors are possible. An objective of this program is to present you with the manner in which human relations decisions are made and to provide the opportunity for you to explore and "try on" some new ways of relating with others. Utimately, we hope that you will find the experiences during the next four weeks are useful in developing your own approach to education.

The model we propose during these four weeks is a simple one. A basic area of human relations will be defined and then three basic steps will follow:

1. You will learn the skills in this area.
2. You will teach some of these skills to someone else.
3. You will teach some of these skills to elementary students.

If all goes well and you enjoy this approach, it is possible you may wish to go on to step four which is leading a fellow elementary student through the program. During the spring term, we plan more extended work in human relations and you may wish to join us in the development and teaching of more skill areas.

The contents of this handbook are as follows:

1. A description of the training program week by week.
2. A summary of the learning objectives for the five week period.
3. A brief summary describing learning objective theory.

SCHEDULE

October 2: Pretesting and first session.
October 6-10: Relaxation and its relevance to the classroom.
October 13-17: Nonverbal communication.
October 20-24: Attending behavior and listening skills.
October 27-31: Decision making and final post testing.

NOTE: Throughout this methods course, we plan to stress the generalization of specific skills to various classroom subject matter areas. Your thoughts and comments in this area are vital.

Summary of Performance Criteria

1. Relaxation. Learning objectives: When you complete this topic, you will be able to:
    1. Demonstrate one form of physical relaxation.
    2. Relate the concepts of physical relaxation to schools, interpersonal relationships, and a variety of settings.
    3. Teach relaxation or a related skill to one other person.
    4. Develop a written program for relaxation training.
    5. Teach elementary students an aspect of the principles of relaxation training.
2. Non-verbal awareness. Learning objectives: When you complete this topic, you will be able to:
    1. Describe and demonstrate a minimum of ten nonverbal exercises.
    2. Describe a variety of perceptions gained from a period of solitude and meditation.
    3. Teach some aspect of non-verbal awareness to one other person.
    4. Develop a written program for teaching non-verbal awareness.
    5. Teach elementary students some aspect of nonverbal awareness.

3. Attending behavior. Learning objectives: When you complete this topic, you will be able to:

   1. Describe the components of attending behavior.
   2. Demonstrate the ability to attend to another person.
   3. Observe the attentiveness of a child in the classroom.
   4. Develop a written program for teaching attending behavior.
   5. Teach an aspect of attending behavior to elementary students.

4. Decision Process. Learning Objectives: When you complete this topic, you will be able to:

   1. Define in written form the process of decision making.
   2. Develop a series of alternate definitions of a problem and alternate solutions.
   3. Teach decision process to another person.
   4. Develop a written program to teach decision making.
   5. Teach an aspect of decision making to elementary students.

5. Race and Ethnic Awareness. Learning Objectives: After you have completed this topic, you will be able to:

   1. Teach another person some aspect of racial and ethnic awareness. (And use concepts from first four hierarchies.)

6. Learning Objectives in Human Relations. Learning Objectives: After you have completed the five week program you will be able to:

   1. Develop hierarchies of learning human relations to achieve specific objectives for practical classroom use.

2. Write performance criteria and learning objectives in human relations.

3. Take another person through the entire hierarchy that you have just completed.

LEARNING OBJECTIVES

A learning objective is an instructional goal expressed in terms of measurable student performance.

The terminal objective is based directly on an actual task performed on a job. (tieing a knot or landing a plane)

The enabling objective is an instructional stepping stone...to write an enabling objective, one must first analyze the terminal objective. Enabling objective always supports the terminal skill.

It is sometimes useful to develop a lattice like structure to see the relationship between terminal and enabling objectives. (See our hierarchies, for example)

Learning objectives should be selected with clear verbs such as describe, choose, and define as opposed to know, appreciate, and understand.

Any learning objective consists of a behavior, a condition, and a standard.
---behavior is demonstration of knowledge, skill, or attitude.
---condition (limits or aids during performance)
---standard (extent of required capability in terms of accuracy, time, or quality.)

Learning objectives may be classified as to type of subject matter:
---knowledge (grasp of facts and concepts)
---skill (problem solving ability, mental or manual)
---attitude (opinions and internal state of mind).

e.g. Knowledge objective: The teacher trainee will be able to demonstrate knowledge of racial facts in a written standardized test with 75% accuracy.

Skill: The teacher trainee will be able to teach racial facts to a microteaching class to the satisfaction of the supervisor.

Attitude: The teacher trainee will be able to discuss his attitudes more freely (as stated by himself in a racially mixed group.

Educational Feasibility

This section provides additional descriptive information on the findings from the research aspect of the subject; examines the implications of these data for implementing human relations training programs in a teacher education setting.

Supplementary discussion of research findings: Evaluation of research data for this study was planned to meet the following objectives:

1. Is the human relations performance curriculum feasible?
2. In a preliminary examination of data, what can be developed to support the validity and feasibility of the project?
3. A second phase of evaluation activities was planned wherein the data will be evaluated more fully and additional supporting evidence for the study will be presented.

The answers to questions one and two have been considered in "Goals of the Performance Curriculum" of this study. The more definitive evaluation from "Design and Implementation of Pedagogical Feasibility Study" will be delivered with Stephen Rollin's detailed thesis.

It may be useful to summarize why the data for this study are presented only in preliminary form and why they will be expanded later in an addendum. The final evaluative post-tests were only completed on October 31. November 14 was provided as the data for this final written report. This allows one week for data evaluation and one week to write a relatively lengthy report. As such, some of the more complex evaluation approaches such as those provided by examining videotapes are not possible. The videotapes require the training of two raters so that adequate interrater reliability is demonstrated. Further, extensive data has been gathered which demands much deeper exploration and examination of new research implications.

The Miskimins Self-Goal-Other self-concept instrument revealed that the trainees significantly improved the correspondence between their ideal and actual self-concept, a measurement generally considered to be an indication of improvement of personal adjustment. Interestingly, the trainees did not improve in the accuracy of their perceptions of how others saw them. This was anticipated as the training program was centered on skills through which the trainee might improve his relationship with himself and with others and was not concerned with the issue of how others see him. Work with the human relations performance curriculum in some planned hierarchies does provide experiences wherein the trainee would be expected to improve in this area.

Some, of course, will question whether or not improvement in self-concept is a valid behavioral measure. They point out that self-concept can not be "seen" or "counted." Our prime response to this comment is that we now believe we have some ideas for testing self-concept wherein more direct behavioral measures may be taken. Among these are: 1) asking student pre and post training to talk about his self-perceptions into a tape recorder. The number and nature of positive self-referent statement may be counted; 2) videotapes of the individual "acting" in stress situations before and after training can be rated as to the amount and quality of "self-assertive" behaviors engaged in by the trainee; and 3) videotaping the trainee in actual class situations and counting instances wherein the trainee is able to act "positively" with students in the class. While the nature of positive acts is not yet precisely defined, we believe we are close to developing behavioral measures for classroom use.

The semantic differential scales, all of which demonstrated significant improvement for the trainee group, are subject to many of the same criticisms of the self-concept instruments. Associated with each area of training was a single behavioral measure which is of such a nature that direct behavioral counts are possible. We believe that the selection delayed auditory feedback test for relaxation training was an error on our part. A recent study at the University of Massachusetts did reveal that the D.A.F. did discriminate on ability to relax between the experimental group and the control group. But this study (Rudman, 1969) utilized a larger number, and utilized for data analysis only those subjects who were in the top and bottom thirds on a scale of anxiety. The data from this more clinical population apparently does not generalize to college students in elementary education. A more suitable behavioral measure for relaxation training may be ratings of the ability of students to relax by non-participants in the program. Other possibilities include ability to control heart rate, blood pressure, etc.

We feel quite confident about the videotape ratings on non-verbal communication and attending behavior. Viewing the tapes ourselves, combined with our past experience in this area makes us feel relatively comfortable in terms of significant differences we expect to find between the groups.

Following is a lesson plan in racial relations developed by one of the teacher trainees as an example of the innovative application of training in human relations skills to this area.

Lesson Plan. Using the concept of relaxation, non-verbal communication, attending behavior and decision making, outline a program you might use to teach race and ethnic relations:

Semester Plan

1. Have the class practice relaxation as a group, in hopes that they will feel more comfortable with each other.
    a. Perhaps members of the class could direct certain techniques.

2. Introduce physical awareness exercises to create awareness of others - working with others.
    a. Members of the class could direct certain exercises.

3. Have the class act out certain distinguishing characteristics of racial and ethnic groups.

4. If the class would like, have different members of the class speak about their ethnic group (origins, customs, etc.) encouraging questions from the class and/or:

5. Have members of the class work individually or in groups to present some aspect of a racial or ethnic group. (presentation of clothing, food, etc.)

6. As a class, share feelings and ideas about race and ethnic relations.

The course evaluation instrument revealed an extremely positive response from the group. We already have observed that the students gave a mean 4.9 rating (out of five possible points) on the value of the course in relation to the remainder of the university and a 4.8 in relation to the School of Education, at the University of Massachusetts.

On a seven point scale asking students how valuable they felt the four hierarchies were relaxation rated 6.4, attending behavior and decision making 6.0, and non-verbal communication 5.7. It seems clear that all four hierarchies were seen extremely valuable.

When evaluating instructional approaches on a seven point scale, the small group instruction rated 6.3, readings 6.3, large group training 6.0, videotape training 5.4, and audiotape training 5.0.

Perhaps the most important question in terms of course evaluation was number 11. "Would you like to take additional work in human relations training if it was available. All participants indicated a "yes" answer.

Following is one typical student-comment regarding the course:

> "I've been exposed to some forms of individualistic human relations 'core-seeking' courses and each one I've taken has added to the ideas expressed in the previous one. This course is like really worthwhile and since a lot of people don't ever get these types of experiences-- well like for me it was an addititive kind of experience and I judge it from that point of view. But looking at the course objectively, all I can say is that the people were right (good) and the material was right (good) and the SIZE was right (good). So all you can do to improve it is keep it going and grooving. Many thanks for your help."

All course evaluations are available, and in essence echo this type of comment. One student raised questions about the artificiality of microteaching sessions, most felt this was one of the more valuable parts of the program. Several would have liked more practice in applying human relations methods to classroom material.

Implications of Data for Teacher Education. It is our impression that the course was well received and affected growth in most of the students. We believe we have the beginnings of a system wherein not only can we teach human relations behavior to teachers, but also provide a systematic method to personal growth which may be seen as an alternative or supplement to counseling. We believe the preventive mental health implications of a framework such as this may be its ultimate greatest value.

The program is financially and methodologically feasible. We feel we can say this unequivocally. The future direction of the project centers around the following:

1. Testing present hierarchies with more specificity.

2. Developing new hierarchies and testing them carefully.

3. Expanding staff resources through the "each-one teach-one" method.

4. Eventually developing a total program for human relations training which may at some point in the future run from kindergarten through graduate school.

We believe the present project represents only a beginning. We have found far more questions which require answering than we had originally conceived possible. We are impressed with the power of this method, and at times somewhat anxious about the thought of a teacher who actually has methods of influencing children and other individuals in his hand. Yet, it seems clear that human relations training, particularly from a systematic frame of reference such as this is an important future direction for education.

Instrumentation and Scoring of Dependent Variables. The Miskimins Self-Goal-Other self-concept instrument (MSGO) is a standardized published test which has shown some promise in self-concept research. In addition to providing a general score, the MSGO has subscales of: 1) self-concept, 2) goal self-concept, 3) perceived responses of others.

A standard semantic differential test for evaluating student attitudes toward the several aspects of the performance curriculum was developed through the following process: Antonyms were selected from Roget's Thesaurus and initially tested for discriminating quality on a group of 53 undergraduate students. Item analysis was utilized to determine the strength of the adjective pairs.

Although time pressure has not permitted the scoring of the videotapes on non-verbal communication, the following procedure is being used: a scale to assess non-verbal communication quantity and quality has been developed which is an adaptation of the Carkhuff-Berenson scales (1969). Two raters, seated in separate rooms will rate the quality and quantity of non-verbal communication as presented on the videotape. The reliability co-efficient between the two raters will be computed and reported.

A scale used previously to assess attending behavior (Ivey and Haase, 1968) will be used with the videotapes of the trainees' and non-trainees' attending behavior skills. Again, two raters will examine the tapes in two different rooms.

The decision making test was developed by Rollin (1969). The subjects were presented with 12 situations (6 presented for the pretest and six for the post-test) from the classroom and were responsible for: 1) developing alternative definitions of the problem; 2) generating alternative solutions; and 3) anticipating future contingencies for possible actions. The participants were scored as to the number of alternatives generated in each category.

The racial relations curriculum test simply asked the subjects to design a written lesson plan to teach elementary students some aspects of racial relations. This test was rated independently by a rater familiar with the concepts of both race relations and human relations training.

The course evaluation form was developed to examine several aspects of the performance curriculum. These items are simply compiled and reported.

Reporting of Data. Data will be reported in tabular form. Where appropriate, statistical tests have been employed. Due to the highly skewed data, the utilization of a parametric statistic appeared inappropriate. Therefore non-parametric statistics were employed as the analytic instrument for the semantic differential and the Miskimins Self-Goal-Other self-concept instrument. The sign-test (Guilford, 1965) was used as the statistical tool. The test of Decision Making (Rollin, 1969) revealed scores that were normally distributed and therefore a t-test could be utilized to reasure levels of significance.

Facilities, Equipment, and Materials

Implementing the performance curriculum in human relations for one hundred and fifty elementary teachers per term would require the following staff, facilities, and support equipment.

Staff. One professor full-time, six advanced graduate students, and thirty-six advanced elementary teacher trainees who have previously experienced the program in human relations training. They would be organized into 12 groups, each with an advanced graduate student on stipend and three undergraduate leaders who are receiving advanced credit and training in human relations. This plan assumes that the graduate students are on stipend. If the students were obtaining course credit, 12 sections should be covered by 12 different students. In this case, one half-time graduate assistantship might be adequate to maintain one hundred and fifty students.

Equipment. Each group would require one television unit for recording and playback, (with good scheduling 3 units would cover the entire program), 6 audiotape cassette units, (35-50 units would seem necessary), a considerable amount of mimeographed materials as no book is presently available to cover these experiences, plus materials available in the school library such as programmed human relations experiences, books, and miscellaneous materials developed by students experiencing the course previously. A 16 mm sound projector, films, filmstrip units, and an overhead projector are all necessary equipment.

Facilities. One room could serve as a human relations learning laboratory. It could be scheduled 48 hours/week (four hours per group) which would entail some evening arrangements. If one room were provided, two video units would be satisfactory for the group plus one playback unit available in the school library. A better plan would be two rooms. If plans for developing working participation with local schools should prove feasible, practical application of microteaching principles in human relations could be conducted in the actual school setting thus helping solve one important space problem.

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ERRATA

Volume I

Page iii - LANGUAGE ARTS 99
BIBLIOGRAPHY . . . . 193 to 141
APPENDIX A . . . . 197 to 145

SCIENCE 157
BIBLIOGRAPHY 193
APPENDIX A 197
APPENDIX B 201

Appendicies C, D & E were left out of Science and should be put in as follows:

APPENDIX C 205
APPENDIX D 207
APPENDIX E 210

Page iv - XI should be changed to IX.

CLIENT ACCEPTABILITY 534
APPENDIX A 547
APPENDIX B . . . . 551 to 550

Page 25 - Under Knowledge., last sentence, three premises: should be changed to two premises:

Page 26 - Third line of page, number 3, should be changed to 2.

Page 219 - There are three pages numbered 219. The second one (Description of PC and IA Tested) should come first, followed by Educational Feasibility, followed by Tables I & II.

Page 236 - Two pages numbered p. 236. Second one should be 238.

Page 241 - Last line in second paragraph, 1.95 should be changed to .95.

Page 285 - Two pages numbered p. 285. Second one should be p. 287.

Page 286 - Two pages numbered p. 286. Second one should be p. 288.

Volume II

Page 339 &
340 - Pages 339 & 340 should be reversed.

ERRATA (continued)

Volume II		Change From	Change To
Page 348 -	Paragraph 2 Line 17	$200 a year and	$200 a year per student and
	18	400	120
	19	of 200	or 60
	21	200	30
Page 350 -	Paragraph 1 Line 2	400	120
	2	200	60
	3	50	25
	4	100	50
	5	300	70
	11	300	70
	13	100	20
	14	300	70
	16	400	120
	17	400	120
	Paragraph 2 Line 2	100	20
	3	50	10
	Paragraph 3 Line 2	200	60
	3	50	25
	Fourth Line from bottom	300	70
	Bottom Line	300	70
Page 351 -	Line 21	400	600

Page 371 - Second Paragraph, Line 1, Figure 13 should be changed to Figure 12.

Page 373 - Figure 12 - Assistant Director For Administration should be changed to Associate Director For Administration.

Figure 12 - Assistant Director For Education should be changed to Associate Director For Education.

Page 374 - Figure 13 - Under Director Program Delivery, Placement should be included between Program Promotion and Guidance.

Page 473 - Figure 4 - Footnote *Credit MSD rpt should be changed to *Administrative System for the Model School Division of the District of Columbia Public Schools. Washington, D.C.: General Learning Corporation, 1968.

Page 490 - Year I - State should be 23% rather than 33%.

Page 487 - Table 1 - Grad Student Total should be changed to 60 instead of 51.